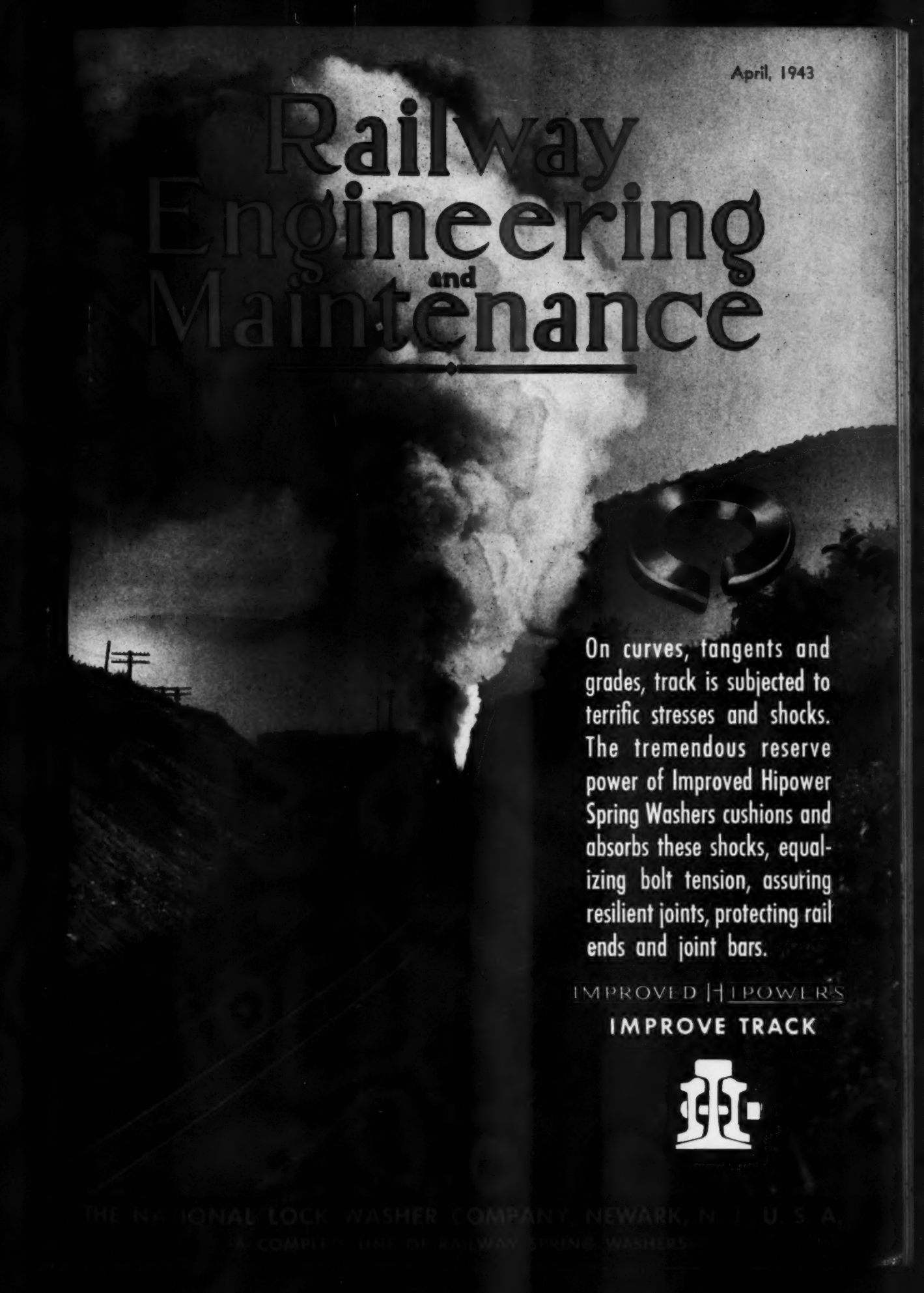
April, 1943

Railway Engineering and Maintenance



Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago, Ill. Subscription price: United States and Possessions, and Canada, $2.00; Foreign, $3.00. Single copies 35 cents. Entered as second-class matter January 20, 1933, at the postoffice at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., postoffice. Address communications to 105 W. Adams St., Chicago, Ill.

A freight train 440,940 miles long

The ton-mileage figure that the railroads have achieved this past year is a remarkable total. But the mere figure does not adequately convey the size of the great job that America's railroads have been and are doing to help win the war. So we set about translating the twelve-digit total into concrete terms. And here's what we got:

If the total estimated tonnage carried by the railroads in 1942 were placed in a gigantic freight train, that train would be 440,940 miles long. It would reach approximately from the earth to the moon, and back again!

Perhaps this helps to illustrate the part the nation's rail carriers are playing in the war effort.

WOOD DRAINAGE PIPE

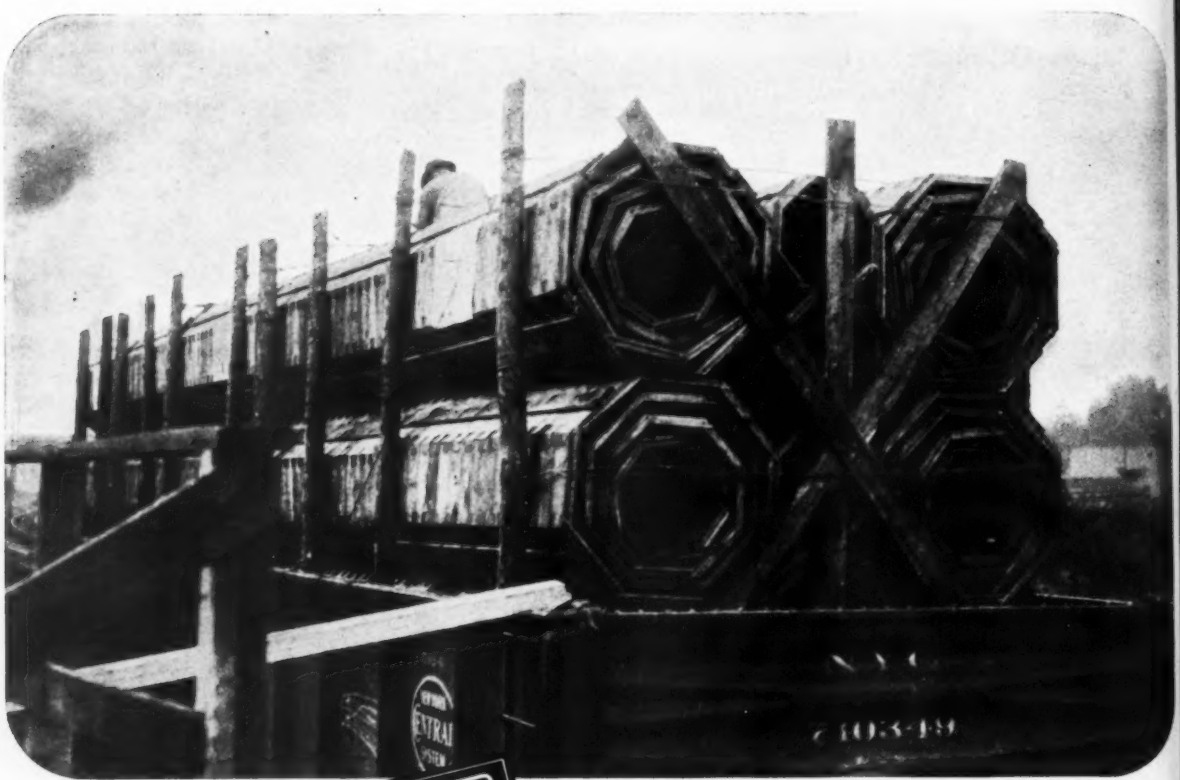
FIGHTS ON TWO FRONTS

Drainage structures made of ARMCO Emergency Wood Pipe are doing an important wartime job at home and conserving thousands of tons of iron and steel. The metal they release may even now be helping to save lives on a distant fighting front.

Yes, essential wartime drainage can be taken care of economically, efficiently and *patriotically*. The new design of ARMCO Emergency Pipe requires no steel sheets and bands, wire mesh, metal reinforcing or other critical materials. It is amply strong to meet railroad requirements. Handling is easy and skilled labor is not required for installation. Equally important, ARMCO Pipe is light in weight and nestable, which often means up to 80 per cent savings in transportation.

ARMCO Corrugated Metal Pipe is only on temporary "leave of absence." It will be back after the war with its flexible strength, long lengths, tight joints, and low installation costs.

Meanwhile, you can aid the war effort by not using steel in any drainage structure unless engineering integrity demands it. The metal you save means more ships, tanks and other vital equipment for our fighting forces. As desirable as the steel product is, you'll find ARMCO Emergency Wood Pipe a mighty practical substitute. Write for complete data. Armco Railroad Sales Co. Inc., 641 Curtis St., Middletown, O.



ARMCO EMERGENCY PIPE

TEAMWORK

for a clear right of way at full speed is vital to performance on the job by transportation. Never in history has there been such an emergency calling for sureness and speed, for dependable equipment to do the hauling . . . and for dependable roadbed to carry the ever-increasing loads that ride the rails today.

Fairmont realizes and accepts its share in the teamwork necessary to help meet the unprecedented demands thrown upon the rail system of America . . . to continue the provision of railway equipment of unquestioned dependability for every phase and department of maintenance work.

Long-standing familiarity with the needs and problems of railroad maintenance has guided the building of the Fairmont Line . . . of motor cars that have been proved under the acid test of PERFORMANCE ON THE JOB . . . to the extent that more than half the cars in service today are Fairmonts. Fairmont Railway Motors, Inc., Fairmont, Minnesota.

Performance ON THE JOB COUNTS

M14 Series G is a 2 to 6 man Light Section Car. Rear lift only 105 lbs.

OF ALL THE CARS IN SERVICE TODAY *MORE THAN HALF ARE FAIRMONTS*

Fairmont
RAILWAY MOTOR CARS

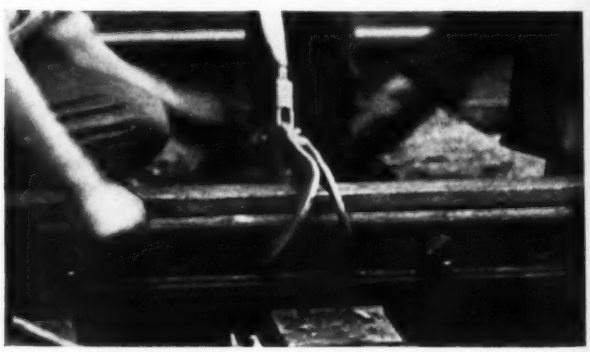
Don't Let *CORROSION* Wreck Your Rail Joints

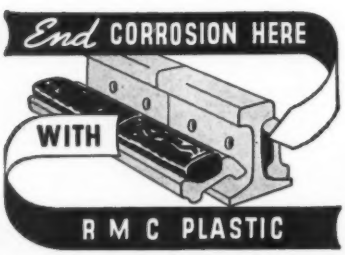
Corrosion is a deadly enemy of steel that attacks persistently and without warning.

But corrosion need not catch you napping. Just one simple application of RMC PLASTIC will give rail joints *complete, permanent* protection against all corrosive agencies.

With the joints well lubricated and corrosion-free the rails cannot "freeze" but are free to expand and contract uniformly when bolts are properly tensioned. The main cause of excessive rail end batter is thus also eliminated.

RMC PLASTIC is easily applied on the inner faces of the joint bars before they are bolted to the rail. The bolting action solidly packs the plastic into every section of the joint assembly.





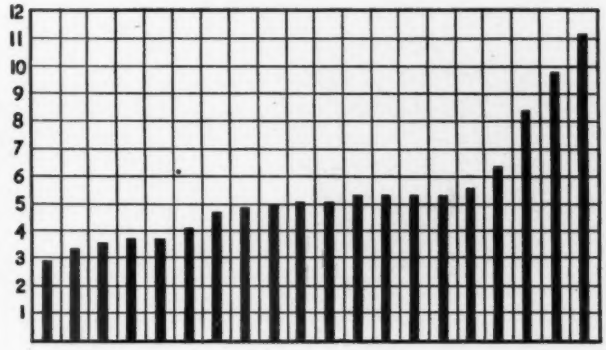
You Can Get **all** the RMC PLASTIC You Need
When You Need It!

RAILWAY MAINTENANCE CORP.
PITTSBURGH **PENNSYLVANIA**

Pressure-Creosoted Tie Life

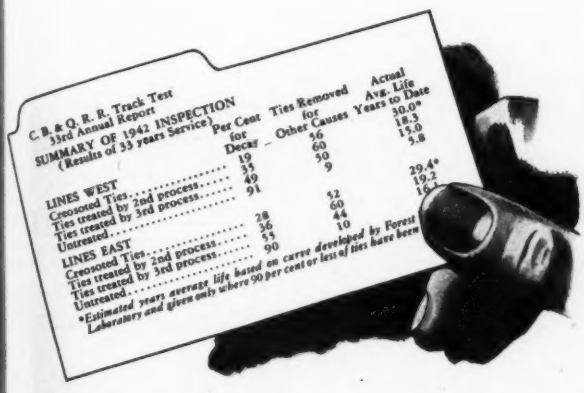
STILL CLIMBING

in C B & Q Test



Back in 1909-10, the exact life of pressure-treated ties was still a subject of debate with many railroad men. C B & Q engineers decided to find out. They made a number of 1000-tie test installations. Recently they released the 33rd annual report.

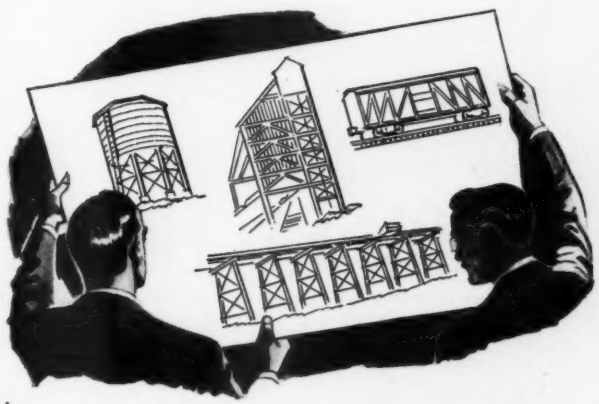
Checks of the life of *untreated* ties show a range of from 2.9 years for cottonwood, to 11.1 years for white oak. Ash, tamarac, loblolly pine, poplar, red oak, white elm and hickory form the median group, with useful service untreated averaging from 5 to 5.5 years.



C. B. & Q. R. R. Track Test
33rd Annual Report
SUMMARY OF 1942 INSPECTION
(Results of 33 years Service)

	Per Cent for Decay	Ties Removed for Other Causes	Actual Avg. Life Years to Date
LINES WEST			
Creosoted Ties	19	56	30.0*
Ties treated by 2nd process	35	60	18.3
Ties treated by 3rd process	49	50	15.0
Untreated	91	9	5.8
LINES EAST			
Creosoted Ties	28	52	29.4*
Ties treated by 2nd process	36	60	19.2
Ties treated by 3rd process	55	44	16.1
Untreated	90	10	

*Estimated years average life based on curve developed by Forest Laboratory and given only where 90 per cent or less of ties have been



This Report shows average life of pressure-creosoted ties as now estimated to be 30 and 29.4 years, for lines west and east, respectively. This continues the steady climb from 28+ years in 1940 and 29+ years in 1941. Between 20% and 25% of the *original ties* are still in service.

Impressive savings—not only in money, but in time—through the use of pressure-creosoted material have led many engineers to extend the proven economies to tanks, trestles, docks, car decks, and other structures. Would you like to see some figures? Just write.

KOPPERS COMPANY
WOOD PRESERVING DIVISION
PITTSBURGH, PA.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

Woolery Tie Cutters work efficiently in rock, gravel or other type of ballast.

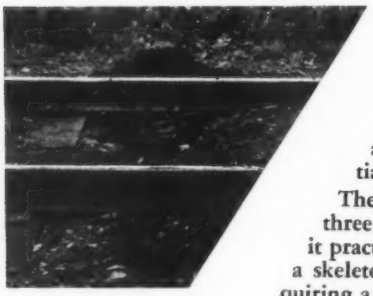
THE GREATEST SHORTAGE OF ALL!

"Lost ground can always be regained . . . lost TIME *Never!*"

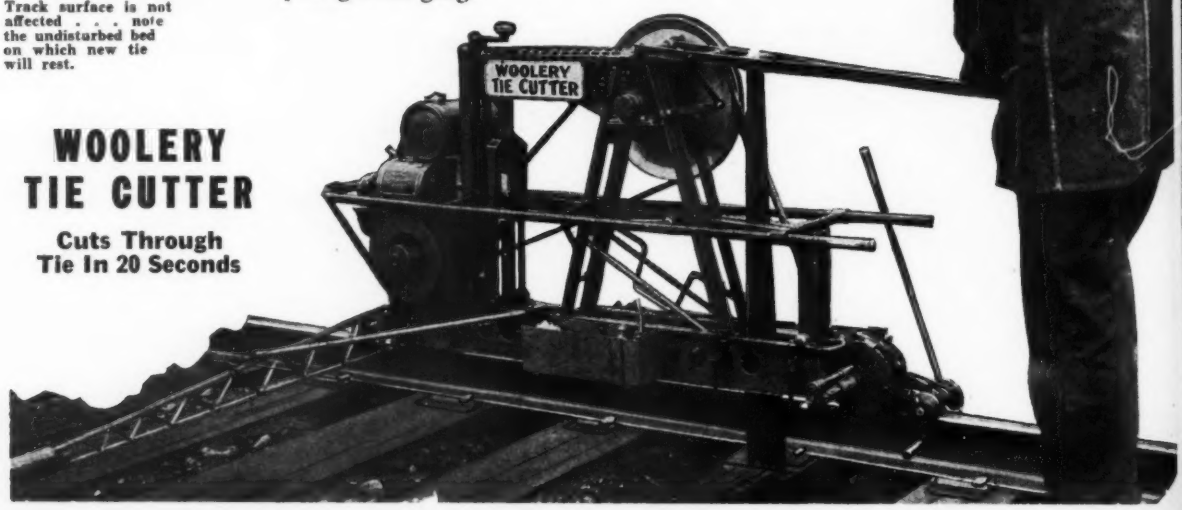
To harassed maintenance men who are trying to crowd two hours of work into one, the saving of time has become a "must" accomplishment.

By saving 30% in time required for tie renewals, the WOOLERY TIE CUTTER is helping relieve this greatest shortage of all for many railroads. It is also aiding them in saving valuable manpower and in accomplishing substantial economies in maintenance of track.

The WOOLERY TIE CUTTER cuts the tie in three pieces which are lifted (not dug) out . . . it practically eliminates retamping . . . it enables a skeleton gang to do the work ordinarily requiring a full gang.



Track surface is not affected . . . note the undisturbed bed on which new tie will rest.



WOOLERY TIE CUTTER

Cuts Through Tie In 20 Seconds

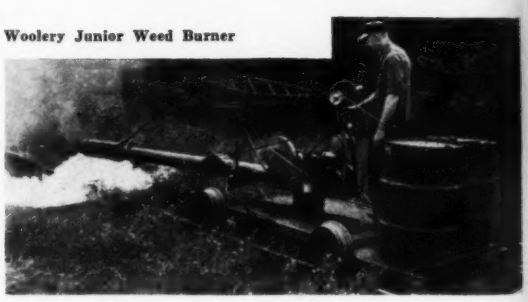
WOOLERY TIE CUTTERS Save Time WHERE IT COUNTS!

Destroy Weeds the WOOLERY Way!

Whether vegetation is rank or light . . . in main line, branch line or yard tracks . . . there's a WOOLERY WEED BURNER designed for the job. Models range from the OCTOPUS 5-burner and 3-burner models to the MIDGET 2-burner and WOOLERY JUNIOR 1-burner types.

WOOLERY WEED BURNERS ARE saving time and simplifying track maintenance on more than 60 roads all over the country.

Woolery Junior Weed Burner



Woolery Maintenance Equipment belongs in your 1943 program. Let us send You Full Particulars.

Woolery Machine Co.

Minneapolis, Minnesota

Fits many jobs

HOUGH SHOVEL AND ALLIS-CHALMERS MODEL WM TRACTOR

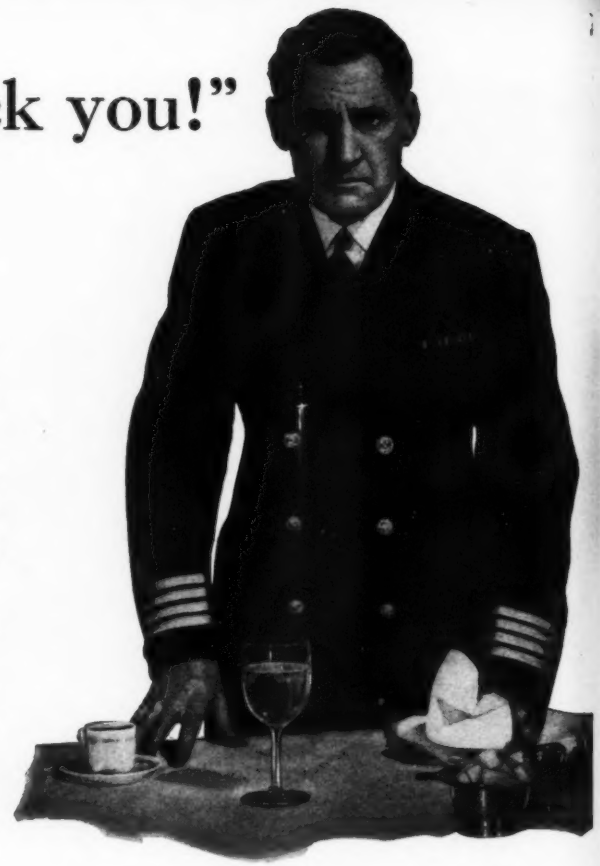
A ONE-MAN OUTFIT!

There's a place for this fast, versatile outfit on a variety of grading jobs. Rugged, strong and heavy enough to "stand the gaff", it digs dirt, clay or gravel. Loads into trucks or carries and places material exactly where wanted. Ideal for handling loose material — as from stockpiles. Bulldozes and levels with a backfiller blade. Drawbar always free for hauling and moving equipment or pulling your graders. Quickly, easily transported on its own transport wheels, in body of truck or by trailer. Hydraulic or cable-operated models. Get all the facts on this all-'round, economical unit. Write for literature..NOW!

The machine of a thousand uses! Ideal for widening right-of-way and building up shoulders and slopes, cleaning and deepening ditches, loading ballast, numerous other jobs. Cable-operated shovel top photo, hydraulic outfit below!

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE, U. S. A.

"I'm going to shock you!"



"Because I'm going to hit right from the shoulder, starting now.

"Out there, our boys are fighting, and they're falling. Not one or two at a time, picked off by a nice clean bullet. But fifty at a time in the roaring, flaming hell of a shell burst.

"Out there, they aren't walking around in clean white uniforms on neat decks. They're running and slipping around on the bloody heaving flanks of a carrier foundering in a sea of oil with her guts torn out.

"They're not lying in cool, immaculate hospital beds with pretty nurses to hold their hands. They're flat on their backs on cold steel taking a smoke and waiting for a doctor to get through with the *seriously* wounded.

"Out there, they're fighting and they're falling but they're winning! And get this straight—they're not complaining. But I want you to know what they're up against. I want you to know they look to you to give them in *your* way the same full measure of help and devotion they get unasked from their own shipmates.

"And you *can* help them—by giving generously to the Red Cross.

"If you had seen the faces of men pulled naked from the sea as they received kit bags and cigarettes handed out on the spot by Red Cross Field Directors—you'd know what I mean!"

* * *

On every front the Red Cross presses forward. Each day, the need increases for your support.

Your Chapter is raising its Second War Fund in March and April. Give more this year—give double if you can.

THE RECORD SINCE PEARL HARBOR

For the Armed Forces—More than one million and a half service men have received, through the Field Staff, practical help in personal problems. The Red Cross is with them in training and at the front. For morale and recreation, over one hundred Red Cross Clubs have been established for overseas troops. There are more than five thousand workers in the field.

Civilian Relief—About sixty million dollars in war relief has been administered in every allied country. Food, clothing, medicinal supplies have gone to Great Britain, Russia, China, Africa, for Polish and Greek refugees, and many others.

Thousands of packages to prisoners of war have been safely delivered through cooperation with the International Red Cross in Switzerland.

The Home Front—Training our people to meet the needs of war. Millions of First Aid Courses. Hundreds of thousands trained in Home Nursing and Nutrition Courses. Thousands enlisted as Nurses' Aides and in Motor and Canteen and Staff Assistant Corps.

More than one million and a half blood donations through Red Cross collection centers and the distribution of the life saving Plasma wherever needed.

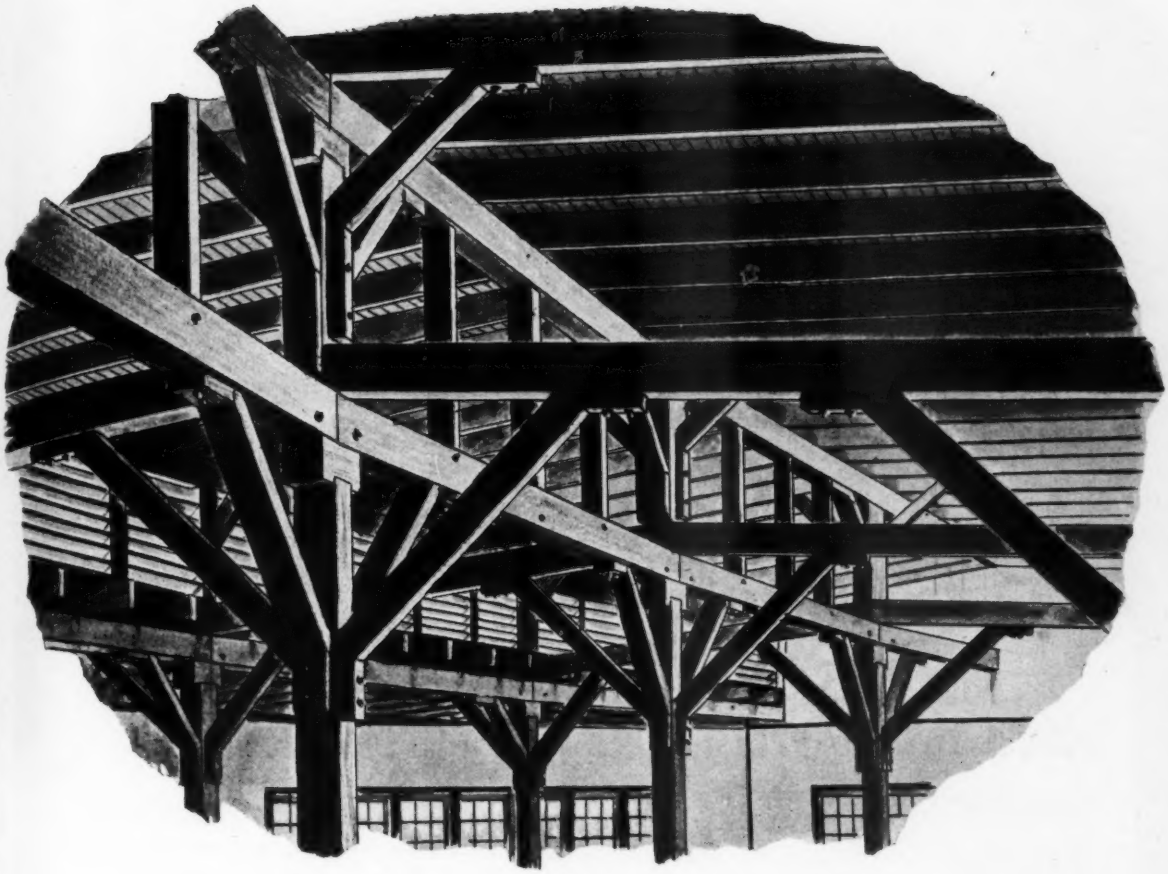
Chapter Production rooms from coast-to-coast providing surgical dressings for the wounded, kit bags for the fighters and tons of clothing for relief.

The Red Cross record in this war is one that we Americans may well be proud of—and support.

Your Dollars help make possible the

AMERICAN RED CROSS

This space contributed by the Publisher



Adds Safety to Roundhouse Roofs

IMPORTANT railway construction like roundhouse roofs are made safer and last longer when "CZC" treated wood is employed. This preservative resists decay and resists fire, too . . . important protection against acid-forming sulfur fumes and sparks. Fire resistance is also especially important to tunnel linings, bridge ties and stringers and fire stops.

Where decay is a major factor, "CZC" adds longer life . . . cuts maintenance on warehouse flooring, loading platforms, pier decking, signs, car lumber and station buildings.

"CZC" treated wood is economical. It doesn't increase unit cost because cheaper grades of treated wood are less expensive than the best grades, untreated. "CZC" treated wood is also available from more sources than the best grades of ordinary timber.

Check sources now for "CZC" treated wood. There is ample preservative and treating capacity to meet both military and essential civilian needs. Write for "Facts about 'CZC'."

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

CZC

CHROMATED ZINC CHLORIDE

BETTER THINGS for BETTER LIVING . . . THROUGH CHEMISTRY

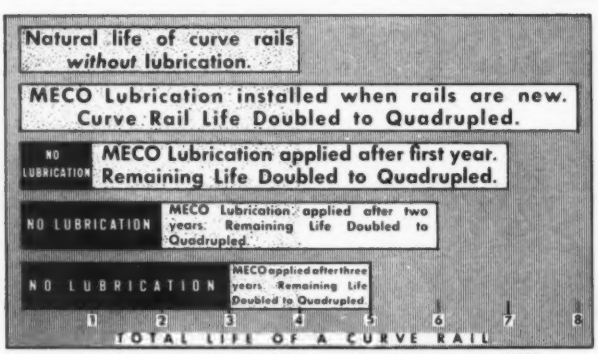
MECO-EQUIP* YOUR CURVES

TO CONSERVE TODAY'S STEEL•••TO CUT FUTURE CURVE COSTS

Each Meco Lubricator Protects a Number of Curves

*MECO CURVE RAIL LUBRICATORS

DOUBLE TO QUADRUPLE THE REMAINING LIFE OF CURVE RAILS!



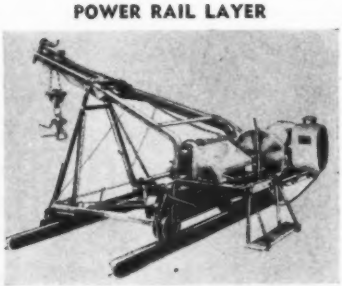
Note that even though a rail is half or even three-quarters worn out, MECO Lubrication will at least DOUBLE the remaining life—and then you will have MECO Lubrication ready to DOUBLE the life of new rails, when you re-lay the curves.

Right now, Meco Curve Lubrication will postpone the purchase of new curve rails for months or years.

The Meco Lubricators you install today will continue on the job and keep on prolonging the life and reducing the cost of curve rail replacements for many years to come.

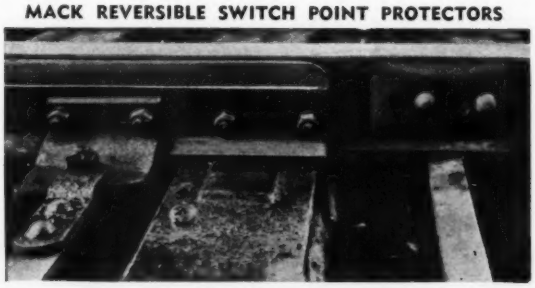
Let us survey your critical curve territories and make a report on actual savings you will make by applying MECO-Lubrication.

POWER RAIL LAYER



Requires No Propulsion Equipment or Train Crew

MACK REVERSIBLE SWITCH POINT PROTECTORS



Prolong switch rail life, 8 to 10 times!

MAINTENANCE EQUIPMENT COMPANY

RAILWAY EXCHANGE BUILDING • CHICAGO, ILLINOIS

MILLIONS IN SERVICE

The One-Piece Design of the WOODINGS RAIL ANCHOR simplifies installation.

The Manner of Applying and Reapplying the WOODINGS RAIL ANCHOR precludes the possibility of damage.

The WOODINGS RAIL ANCHOR retains indefinitely its ability to hold after countless reapplications.

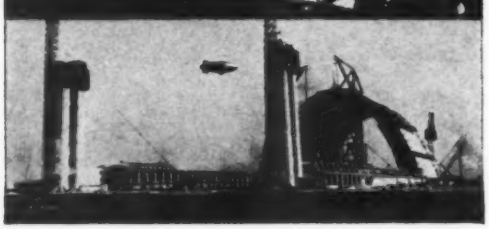
Woodings Rail Anchor

W

WOODINGS FORGE & TOOL CO.

VERONA, PA.

The **TECO** *Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.*



New Navy Blimp Hangar, 1000 feet long; 153 feet high; clear-span roof 237 feet. Timber treated for fire resistance according to Federal specifications. Trusses prefabricated by Timber Structures, Inc., Portland, Oregon.

OUR NAVY BUILDS WORLD'S GREATEST TIMBER STRUCTURE

mammoth blimp hangar was made possible by

TECO CONNECTOR ENGINEERING

Two announcements of the widest import to American engineering have just come out of Washington.

The U. S. Navy has announced that a giant blimp hangar, engineered entirely in timber, is nearing completion "somewhere in the continental United States."

The War Production Board has announced that "such a structure could not have been built of wood by ordinary methods without the use of timber connectors . . . The steel ring timber connector, which is used to increase the strength of joints in wood construction, saved more than 400,000 tons of steel for essential war production in 1942." WPB added that 2,050 tons of structural steel will be saved in this hangar alone.

In erecting this vast, multiple-truss assembly, Navy engineers have accomplished a notable achievement in modern timber connector engineering. The hangar is the latest of scores of large Navy, Army, and Maritime Commission projects built with Teco timber connectors under the revolutionary Teco system of timber engineering. It is one of over *100,000* heavy-duty structures, of over *600* types, built under the Teco connector system in the past few years. They include clear-span factories, bridges and trestles, towers, tanks, warehouses, docks, shipyards, and many others.

Write today for our FREE Reference Book for engineers and architects showing 45 *"Typical Designs of Timber Structures."*

TIMBER ENGINEERING COMPANY

NATIONAL MANUFACTURERS OF TECO TIMBER CONNECTORS AND TOOLS

WASHINGTON, D. C. PORTLAND, OREGON

IT'S THERE WHEN YOU NEED IT...

The need for many time-and-cost saving advantages has been accented now, more than ever before, as Link-Belt Speeder shovels, draglines and cranes assist in the vital job of maintaining right-of-way, banking, ditching—bridge work and similar jobs.

These machines can be shifted from one spot to another quickly and with a minimum of bother—no need to shunt other equipment and cars onto a siding in order to get the shovel, dragline or crane through to the spot at which it is needed. A Link-Belt Speeder travels under its own power—goes about its vital business without interfering with routine operations.

21 different models of crawler and truck mounted shovels, draglines and cranes—a machine for every need.

Buy War Bonds—Keep Cars Rolling. 9081

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF SHOVELS—CRANES—DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)

No. 172 of a Series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: War Time Changes
In Your Magazine

April 1, 1943

Dear Reader:

In this issue you will notice a narrower margin on the page, both top and bottom and at the side, than has been customary heretofore. This is in compliance with an order issued by the War Production Board requiring all publishers of magazines to effect reductions of 10 per cent in their consumption of paper. Means for effecting this reduction were left to the publisher. Among the alternatives are (a) the curtailment of circulation, (b) the use of a lighter (thinner) sheet of paper, (c) a reduction in the number of editorial pages, (d) the curtailment, or rationing, of advertising, (e) the elimination of unnecessary copies, etc., and (f) a reduction in the size of page.

After careful study of all these and other possibilities to determine which would least affect our service to you, we have selected the last alternatives as least objectionable. In other words, we are not curtailing the amount of information brought to you in editorial and advertising pages but are securing the necessary reduction by (a) eliminating unnecessary copies by stopping subscriptions more promptly after expiration, by curtailing the use of copies for office use, etc. and (b) by reducing the page margins at the top, bottom and side.

While we concede that this latter action detracts from the appearance of the printed page, we have concluded that it is preferable to reducing either the number of pages or the size of the printed portion of the page, which measure the amount of information we bring to you. And this reduction in margins alone effects a saving of 6.2 per cent in paper.

Another wartime measure which we do not like because of the possibility of its adverse effect on the condition of the magazine you receive but which is apparently a necessary outgrowth of the war, is the reduction in the stitching (or the number of staples used in binding the magazine) for, beginning with the issue for last November we have been required to reduce our stitches to one, as compared with two previously, to conserve highly critical steel stitching wire. To overcome this weakening of the binding, we are giving the covers extra glue. While by this means we do not save a large poundage of stitching wire, it is said by WPB authorities to amount to a considerable tonnage when applied to all of the magazines of the country.

We are also facing disturbed conditions in other respects. In the paper itself, you may have noticed a slight decrease in brightness due to the diversion to war industries of a large part (now 30 per cent) of the chlorine heretofore used to bleach the pulp. Colored inks are also becoming increasingly difficult, and in some instances impossible, to secure while the normal black inks have lost some of their lustre because of the growing scarcity of component materials. In illustrations, the situation is becoming especially acute, for engravers are now limited to quotas of copper and zinc 50 per cent below normal.

In these and other ways, the problem of publishing Railway Engineering and Maintenance is steadily becoming more difficult and more complicated. We are adopting every expedient that we can to maintain the quality of our service to you in the belief that you need this service even more in these days when the demand for information is all the greater.

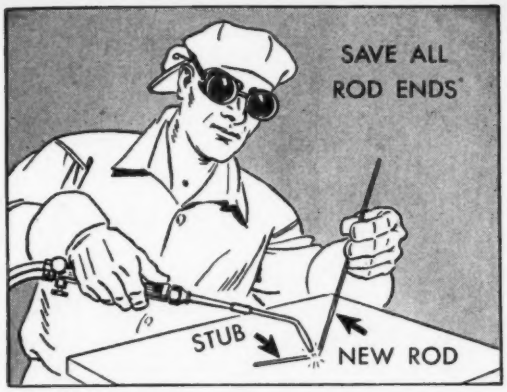
Yours sincerely,

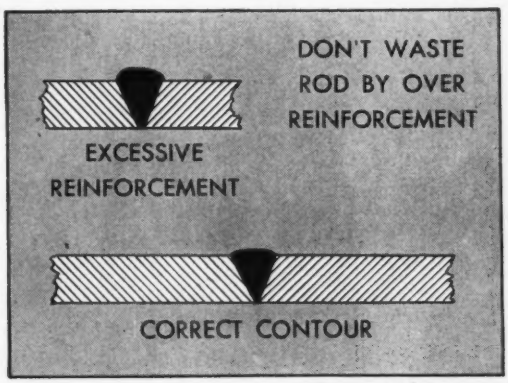
Elmer T. Howson

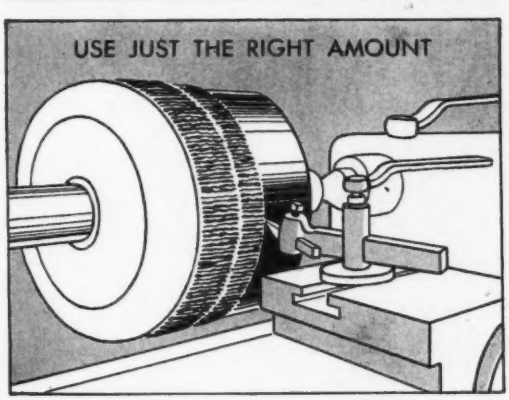
ETH:GP

Editor

Make the Most of Your Welding Rod Supply







Save All Rod Ends and tack-weld them to new rods to be used up completely. This can be done as work progresses, or by accumulating stubs in a container for later joining.

Use Steel Or Cast Iron Rods in place of bronze rods whenever possible. Many repair jobs can be done by preheating the part and using cast iron rods, thus saving bronze rod for repairs where its use is essential.

Do Not Over-Reinforce Welds. This practice may actually weaken the joint, and it wastes both rods and gases. In many cases the included angle of welding vees can be safely reduced.

Hold Bronze Deposits To Close Tolerances when they are to be machined and avoid subsequent waste of bronze that must be chipped off.

You can obtain reprints of this page in any quantity you require for distribution in your shops, without charge, upon request.

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building — Chicago and New York

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

The word "Oxweld" is a registered trade-mark.

THE BARCO WAY

REDUCES TYTAMPING TIME LABOR and COSTS TO A MINIMUM

BARCO GANG TAMPING

12 Barco Tytampers Operating From a Small, Compact, Off-The-Track And Out-Of-The-Way Power Plant Costing Less Than $100.

BARCO SPOT TAMPING

Each Barco Tamping Unit Is Self-Powered And Easily Carried By One Man. No Other Equipment Needed.

7 YEARS SATISFACTORY SERVICE
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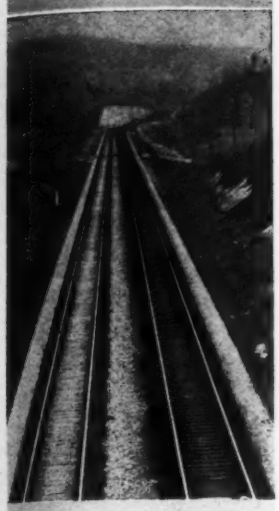

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

APRIL, 1943

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 West Adams Street, Chicago

NEW YORK
30 Church Street

CLEVELAND
Terminal Tower

WASHINGTON, D.C.
1081 National Press Bldg.

SEATTLE
1038 Henry Bldg.

SAN FRANCISCO
300 Montgomery St.

LOS ANGELES
Union Bank Bldg.

Subscription price in the United States and Possessions and Canada, 1 year $2, 2 years $3; foreign countries, 1 year $3, 2 years $5. Single copies, 35 cents each. Address H. E. McCandless, Circulation Manager, 30 Church Street, New York, N.Y.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.)

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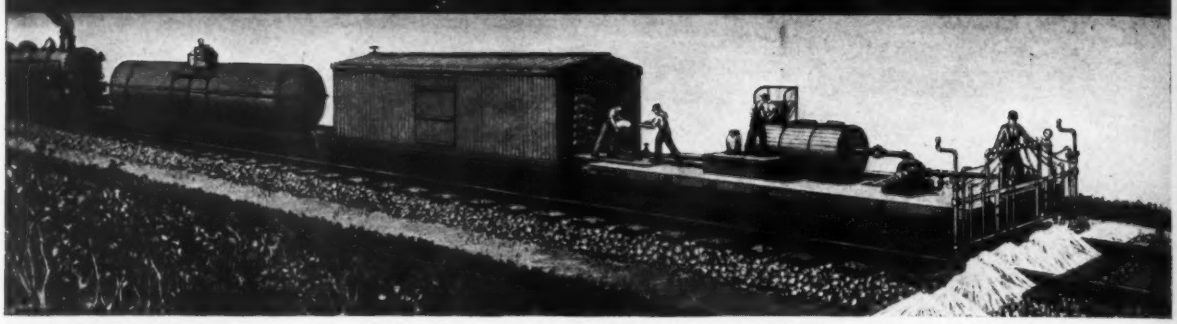
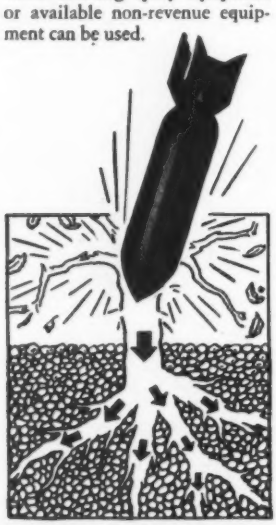
BYSULOX* R.R. WEED KILLING

···Meets Today's Limited Equipment–Manpower Conditions!



Note relative simplicity of BYSULOX SPRAY TRAIN *as compared with previous methods!*

NO REVENUE EQUIPMENT NEEDED! The BYSULOX METHOD does *not* require the use of revenue standard equipment. Existing spray equipment or available non-revenue equipment can be used.



BYSULOX "DEPTH BOMBS" WEED ROOTS! BYSULOX swiftly penetrates weed foliage and stems—actually "Depth Bombs" weed roots by its "killing as it translocates" action.

The ultimate in simplicity with full effectiveness, the BYSULOX METHOD of chemical weed control operates with a minimum of equipment. Existing spray equipment can be readily adapted or only non-revenue standard equipment need be used!

The BYSULOX SPRAY TRAIN requires no standard tank cars for carrying concentrated liquid chemical—it carries easily-used chemical *in a convenient dry flake form,* in an open end box car. No time is consumed at water tower stops to prepare diluted weed killer solutions as in previous methods. Mixing is continuously accomplished in a tank mounted on a flat car *while the train is in operation.* Water from a non-revenue water car also runs continually into a tank mounted on the flat car, and as spraying proceeds, dry BYSULOX is added and taken into solution by regulated agitation. Operating speeds of 12–18 m.p.h. may be obtained and up to 100 miles of single track may be treated per day.

The BYSULOX train carries only one or two water tanks—readily accommodates itself to heavy traffic conditions.

WHAT IS BYSULOX?

BYSULOX is a dry flake form, chemical combination of a powerful weed killing agent, processed with an organic surface active agent to make its action even more effective. It is quickly soluble; and also contains 3½% of Oxides of Arsenic (this is only one-twentieth to one-fortieth of that contained in standard Sodium Arsenite weed killers previously used).

BYSULOX *is a tissue and cell breaking penetrant that works through the plant—not through the soil.* It has a two-fold action:

1. *Destructive* penetration of the foliage.
2. Translocation *within* the inner circulatory system of the plant to attack and destroy the deep roots.

6 REASONS WHY YOUR ROAD SHOULD USE BYSULOX

1. *Meets war time conditions.*
2. *Reduces* work train time, cost and equipment.
3. Quick, positive results on all railroad weeds.
4. *Eliminates* bulk tank car mixing.
5. Improves drainage—prevents fouled ballast.
6. Provides weed-free track—opens track visibility.

A Product of General Chemical Company

Write today for further details and working drawings of apparatus to:

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Railway Engineering and Maintenance

A Great Record—

But Tougher Days Ahead

Every railway employee is aware of the fact that the railways are handling a very heavy traffic. Most of them appreciate the fact that this traffic is running at record levels. Yet few realize the full measure of the railway performance to which they are contributing through their efforts.

The railways rendered more freight service in October, 1941, than in any month previous to that time. In that month, their revenue ton miles exceeded those of October, 1929, the previous record month, by more than 8 per cent. Yet in each of ten consecutive months of 1942, the amount of freight service performed was greater than in October, 1941, while last year's peak movement in October was 30 per cent above that for the record month of October, 1941. Again, the amount of freight service performed in the *last half of last year* was 15 per cent greater than the total for the average *whole year* in the ten years preceding 1941.

In passenger service, the performance of the railways is even more spectacular. Prior to last year, the record month for passenger service was August, 1920. Yet this peak was passed in each of five consecutive months last year and the volume handled in December, 1942, was 26 per cent larger than in August, 1920. Furthermore, 12 per cent more passenger service was rendered in the *last half* of 1942 than in *all the year* 1939 and the service in this *six months' period* exceeded by 60 per cent the *annual* average for the ten years preceding 1941.

More to Come

Never before have the railways provided so much service. Never before have they operated with such efficiency. And never before have the tracks and structures been subjected to such severe wear and tear for so long a period. Furthermore, the maximum has not yet been reached for the ton miles in the first two months of 1943 were 29 per cent greater than in those months a year ago, and it is estimated that the railways will be called upon to produce 10 to 15 per cent more freight and 20 per cent more passenger service this year than in 1942.

Maintenance forces are entitled to their full share of credit for this remarkable record for they have so maintained the tracks and structures as to enable them to carry this all-time peak of traffic safely and expeditiously. Their achievement is all the more noteworthy when one recognizes the shortages of materials and of late the labor, with which they have been confronted. These deficiencies call for still greater discretion in the use of the materials and the labor that are available in order that those repairs are made that are most essential to dependable transportation. And the end is not in sight for not only are the traffic and the corresponding wear and tear expected to increase still further but the difficulties of securing the sorely needed materials and labor are likewise expected to become more acute.

The achievements of maintenance men to date are great. The responsibilities of the days ahead are even greater. The nation needs railway transportation more today than ever before. The railways and their maintenance forces will not let it down.

Salt Treatment—

Gaining Acceptance for Railway Structures

IT IS an ill wind that brings no good. Just as new maintenance organizations, new methods, new equipment, and greater efficiency in carrying out many classes of maintenance of way and structures work came out of the depression period, so are certain to come, directly or indirectly, further changes out of the present war period, that will affect construction and maintenance practices for many years to come. Some of these will come about through the enforced use of new materials brought about by the shortages of the more common materials; others will arise out of shortages of labor; some will develop as thousands of railway men study and analyze their daily problems more critically than ever before; while still others will be accepted by construction and maintenance men on the basis of the experiences of men entirely outside the railway field.

Among the many changes that can be expected is the more general use of salt preservatives in the treatment of wood for a wide range of timber construction, preservatives that not only prolong the life of wood under adverse conditions, and protect against the attack of termites, but which, in themselves, or with added special salts, give to it a substantial degree of fire resistance. Such preservatives have not been unknown to the railway field, but their value for above-ground protection have appeared too intangible to impress many railway construction and maintenance men, especially in a period when it was essential to stretch every maintenance dollar to the limit, and immediate results seemed imperative. Even for those parts of buildings, such as roofs, floors and platforms, where decay is most prevalent, and unmistakably the limiting factor in the life of the material, resistance to the use of salt-treated lumber has persisted in many quarters.

Gradually, this situation is changing. Already, one road after another has employed salt-treated wood for enginehouse roofs, where decay due to condensation presents an especially acute problem. Some of these same roads have salt-treated other timber employed in their newer enginehouses. Some roads had made increasing use of salt-treated wood for floors and exposed platforms, and not a few are beginning to employ this material above the ground in piers, warehouses, freight houses and passenger stations.

To date, the decay-inhibiting and termite-deterring qualities of such lumber, combined with the fact that it is non-poisonous, odorless, does not contaminate lading and can be painted readily, have dominated considerations favorable to its use, but there is growing appreciation of the fire-resistant qualities that are or can be imparted to this lumber, a factor which is becoming of greater importance in these days of increasing scarcity of building materials, the greater value of equipment and lading that may be housed, and the all-important avoidance of disrupting the continuity of railway operations. It is significant that the army has used millions of board feet of salt-treated lumber in the buildings at its cantonments and embarkation points, because of its fire-resistant qualities, a fact that should impress railway construction and maintenance men as to the greater value of this factor in their buildings, many of which are more permanent and valuable than those erected by the armed forces.

All of the benefits involved, combined with higher costs for construction lumber and timber, seem certain to increase the acceptance of salt treatment within its proper scope, until the day may come when, within this scope, it will have the same general acceptance that creosote treatment has attained for the generally more severe ground and atmospheric conditions.

Work Equipment—

Good Maintenance Never So Important

MUCH emphasis has been placed on the present and prospective labor shortage and the important part that mechanization of the maintenance forces can play in offsetting the effects of insufficient labor, a condition that is certain to continue to the end of the war. Although fully realized in many quarters, sufficient emphasis has not been placed on the importance of good maintenance in enabling machines to make up the deficiency in labor.

In the first place, repair parts may be almost as difficult to obtain as complete machines, and where they can be obtained, much time is likely to be lost in doing so. In fact, in some cases the old part must now be surrendered before the new one will be delivered, thus keeping the machine out of service while the exchange is being made. In a few cases it has been impossible to obtain certain repair parts. Up to recently, so little difficulty has been experienced in the procurement of replacement parts that the railways have maintained either no stock or only a limited stock of these parts. For this reason, when an essential but unobtainable part of a machine breaks or wears beyond the possibility of further service, there is little that can be done except to relegate the machine to storage, unless the part can be made in the railway's own shop.

In his address before the Maintenance of Way Club of Chicago, which was published in the March issue, G. R. Westcott made a strong appeal for more maintenance and less repair of power machines and tools, suggesting with respect to the field man responsible for the condition of the machines that "we call him a maintainer and hope that as such he will, by visiting the machine frequently, inspecting it carefully and conferring freely and sympathetically with the operator, keep it running instead of having to 'get it back into service.'"

Every officer who has any connection with the use of work equipment in any of its forms should make it a personal matter today to see that the machines are not being abused, that they are being lubricated, that dirt and grit are being kept from moving parts and particularly from wearing surfaces, that air cleaners are in good condition, that bolts are tight, that the capacity of the machines is not being exceeded, that the engines are not raced and that other precautions are being exercised to insure minimum wear on the machines.

These officers may not have expert knowledge of the construction, the operation or the mechanical features of the machine, but they should be sufficiently familiar with it to know whether the foregoing requirements are being met. In any event, if they evince enough interest to investigate these items, the operator will be spurred to watch them more closely and thus the machine and its

operation will be benefited and the useful life of the machine will be extended. Maintenance, as contrasted with repair, was never so important as it is today.

Rail Lubricators—

Merit Calls For More Extensive Use

WHILE the public has been absorbed with the enlarging scope of food rationing in recent weeks, most of those in charge of track maintenance are far more concerned about some of the "rationing" of track materials and supplies that is handicapping them in their work. One of the most serious evidences of track material "rationing" is in rail, the fundamental element of the track structure, and without which wartime railroad transportation will be seriously jeopardized.

During the recent depression years when traffic was at a low level and when money was not available for other than the barest essentials in new rail, maintenance officers concentrated much of their attention on measures designed to increase the service life of the rails in track. From a strictly economic standpoint, they adopted and expanded the use of such measures as rail-end hardening, welding and grinding; joint reconditioning; the cropping of rail ends; the use of joint packing to improve joint conditions and prevent rail and joint bar corrosion; and the installation of rail and flange lubricators to, among other things, minimize wear of the rails on the high sides on curves. Now, when traffic is at an all-time high and money is available for necessary rail purchases, but when military requirements for steel restrict the quantity of rail that can be made available to the railroads, the need for the more widespread adoption of all of the various means of extending the service life of rails is still more pressing, for entirely different reasons.

That there has been a general expansion in the use of these various expedients is not questioned, but whether that expansion in some cases has been broad enough may well be questioned. To cite only one example, take the use of rail and flange lubricators, a device of unquestioned merit, which experience has shown to increase the life of rails on curves from two to four times, with other advantages, including a reduction in the regaging and relining of curves, with its effect in prolonging the life of crossties, reduced wheel flange wear, higher permissible train speeds with safety, and, in many cases, higher tonnage ratings.

From the standpoint of the track forces, rail lubricators save critical materials and save in the labor necessary to maintain good track—the latter consideration, under present conditions, being equally as important as the former. When one road after another demonstrates that, properly lubricated, the life of its curve rail can be doubled, and in some cases quadrupled; when a specific road found it possible to eliminate from its maintenance budget an item of $1,000 a month for transposing curved rails in one of its large terminals following the installation of 13 lubricators; and when certain maintenance officers have been afraid to accompany their budget requests for lubricators with truthful statements of the return possible on the investment in these machines because it might appear unreasonably high to their managements, is it not to be wondered that there are still miles of important curved track that are not lubricator-equipped?

The War Production Board has looked upon these machines with a high degree of favor as a means of minimizing the need for new rail, and has been making available to manufacturers sufficient material to enable them to fill their orders. Can it be possible that there are those on this Board whose vision in track matters exceeds that of some who call themselves specialists.

Weed Control—

Adequate Programs Will Save Labor

WHILE it is still too early in the season to inaugurate programs of weed control and eradication to keep railway tracks free from weeds in the months ahead, it is not too early to give this annually recurring problem serious consideration if the handicaps of weedy tracks are to be prevented during the coming summer. Every track maintenance officer knows the disadvantages of weed growth in the track—that it fouls the ballast, retards the flow of water from the roadbed, stimulates the decay of the ties, interferes with certain classes of track work, makes adequate inspection of the rail and fastenings impossible, and may interfere with train operations—but not every maintenance officer is as diligent in planning, promoting and carrying out his weed control program as he should be, hoping that he can "get by" in a period when he is pressed by other work and is short of labor.

This attitude is a mistake under any conditions. It is particularly short-sighted in the light of the very conditions that tend to create it—the pressure of other work and a shortage of labor—because weedy track is track that is difficult to maintain. If proper mechanical or chemical means of weed control are not undertaken, it is certain that thousands of man-hours will be wasted in unprogrammed, unauthorized weed removal by hand, because it is known that track men will not—cannot—work in track that is overgrown with weeds, and, in self-defense, will do considerable weeding by hand if other means are not provided. They know the consequences when weeds are neglected—of the heavier growth and greater difficulties in the future.

During the depths of the depression, when money to control weed growth was not available on many roads, much of this class of work had to be neglected, but today, with most roads in much improved financial condition, nothing should be allowed to stand in the way of adequate programs. Weed mowers, weed burners, discers and scarifiers, and dry and liquid chemicals have all proved effective in weed control and eradication work. Properly employed, with accurate knowledge of the characteristics of the weeds to be destroyd, these methods need not interfere with other essential work and will not waste labor. On the contrary, they will facilitate the carrying out of many other classes of track work and, more likely than not, will avoid the waste of many man-hours in pulling weeds by hand. Where large-scale chemical control of weeds is undertaken, it is not without significance that the maximum amount of weed destruction can be accomplished in a given period with practically no expenditure of maintenance of way man-hours.

North Western Line Yields More Than

Materials for Victory

No. 9 of a Series

This article tells of the dismantling of 99 miles of the road's 102.7-mile Linwood-Hastings line in Nebraska, to make the rails and joint bars available for track construction in military establishments. Equally as interesting as the large volume of materials released are the unusual methods employed to load out track and bridge materials, involving a cableway continuous over the material cars, capable of handling rails, ties and bridge timbers in multiple

Above—Loading Eight Rails at a Time With the Cableway Hoist. Below—All Eight Rails Are Brought Together in One Continuous Pull of the Hoist Cable

THE removal of 99 miles of a line on the Chicago and North Western in Eastern Nebraska recently has put thousands of tons of track materials, more than 100,000 crossties and numerous other items of railway property back into effective use in the interest of the war effort—in military establishments, on the railroad itself, and in the nation's essential scrap pile. At the same time, the dismantling methods employed were unique in a number of respects, especially as regards the removal and loading out of the rails, ties and bridge materials, reducing costs and speeding up operations generally.

The North Western line involved in the abandonment was its Linwood-Hastings line, 102.7 miles long, all of which has now been removed except approximately three miles within the limits of the city of Hastings, which was sold in place to the Missouri Pacific. The abandoned line, built in 1888 through the agricultural district of the so-called South Platte area of Nebraska, was for many years a profitable feeder for the North Western. However, the advent of the automobile and hard-surfaced roads brought about a great change in the transportation needs and modes in the territory served, which, combined with the fact that it is served also by main and branch lines of the Burlington and Union Pacific, along with the Missouri Pacific at Hastings, gradually made the line less essential to the area and less profitable to the railroad. Faced with this situation, the North Western had sought its abandonment for a number of years, but unsuccessfully until December 24, 1941, when authority was granted by the Interstate Commerce Commission to abandon operations, largely in the interest of making the track and other materials involved, and especially the rail and joint bars, available for use in the construction of military establishments about the country.

Valuable Materials Recovered

Single track throughout, with few sidings, the Hastings line had an undulating grade with a maximum gradient of one per cent, and approximately 61,200 ft. of curves. Of the curves, 46 were of 3 deg. or less, and 10 ranged from 5 to 8 deg. For the most part, the line was laid with 60-lb., 30-ft. rail, with 26-in., 4-hole angle bars, although it included relatively small amounts of 50, 65, 80 and 90-lb. rails. Ties were 6-in. by 8-in. by 8-ft., largely of lodge pole pine, treated with zinc chloride or a zinc chloride-petroleum mixture, although some renewals had been made with creosoted yellow pine. Ballast throughout was of cinders.

Bridges on the line included 14 steel

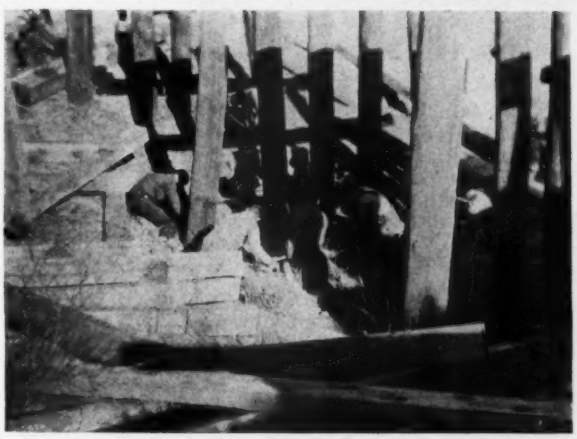
Abandonment

24,000,000 Lb. of Metal

spans, ranging in length from short I-beam spans to a deck plate girder span 71 ft. 3 in. long, while the timber bridges included 7 consisting of a total of 79 13-ft. spans built of treated piles and timber, and 71 bridges consisting of 337 13- to 16-ft. spans built of cedar and treated piles. In the latter 71 bridges, 195 of the bents were of treated piles, while the remainder were of untreated piles. The total length of the pile bridges on the line was 5,572 lin. ft.

All of the track rails and angle bars, which had been requisitioned by Metals Reserve Company, a subsidiary of the Reconstruction Finance Corporation, for navy depot track construction, were loaded and shipped to the railroad at Linwood, and from there to points designated by the Navy, while all other track fastenings, such as spikes, bolts and tie plates, were picked up and either salvaged or sold as scrap. All cross and switch ties which appeared to be sound were turned over and inspected following the rail removal operations, and all those with an indicated service life of five years or more were salvaged for re-use in yards, sidings, branch lines or secondary main lines elsewhere on the road. Only two of the steel spans on the line, a 35-ft. deck plate girder span and a 23½-ft. I-beam span, were salvaged for re-use, all of the others, low rated for the present power on the road, being sold as scrap. The salvaged structures were dismantled and loaded on cars and sent to the road's bridge yard at Chicago for reconditioning and subsequent re-use.

Bridge timbers in sound condition, both treated and untreated, were salvaged, including all pile cut-offs with a length of 10 ft. or more, and were sent to the roads' nearest storehouse at Norfolk, Neb. Other sizeable items of fixed property disposed of in one way or another, included several hundred feet of concrete and cast iron pipe, a large number of steel fence posts, a 70-ft. turntable located at Hastings, several water tanks, with steel or wood supporting structures, and a considerable number of depots and station grounds structures. The accompanying table lists the major items recovered from the line, including the amount of material involved and its disposition, planned or already made. Summarizing the list of materials recovered, it is seen that the line yielded approximately 11,000 net tons of rails and angle bars for military use; more than 331 tons of usable track materials for re-use on the railroad; 64.2 net tons of usable bridge steel and hardware; 150 M.B.M. of treated and 350 M.B.M. of untreated



Right, Above—Pile Stubs Were Loaded Several at a Time. Right — All Piles Were Cut Off Close to the Ground Line. Below — Loading Bridge Timbers with the Cableway Hoist

bridge timbers; 15,000 lin. ft. of pile stubs; more than 100,000 crossties; and more than 647 net tons of track and bridge scrap, as well as a considerable quantity of culvert pipe and miscellaneous items.

Significant of the abandonment, as is indicated in the foregoing list, is the plan that was adopted of offering for sale locally practically all of the ties presented to dispose of some of the land of the company through sale at the same time.

Material and Facilities Recovered In the Dismantling of the Linwood-Hastings Line

Items	Units	Disposition (Planned or Already Made)
Rail	20,488,601 lb.	To Metals Reserve Company
Rail	399,580 lb.	Scrap
Angle bars	1,639,024 lb.	1,522,894 lb. to Metals Reserve Company, and 116,130 lb. scrap
Crossing frogs and turnouts	250,898 lb.	228,798 lb. salvaged, 22,100 lb. scrap
Spikes and bolts	502,110 lb.	13,010 lb. salvaged, 489,100 lb. scrap
Tie plates	420,545 lb.	Salvaged
Total track metal	23,700,758 lb.	
Srossties	100,000	Salvaged
Turntable (1)	33.75 tons	Sold
Bridge steel	147.85 net tons	24.25 net tons salvaged 123.6 net tons sold
Concrete pipe	1,026 lin. ft. from 30 in. to 84 in. in diameter	Salvaged
Galvanized iron pipe	92 lin. ft. from 15 in. to 24 in. in diameter	Salvaged
Cast iron pipe	132 net tons	Salvaged
Treated bridge timber	150 M.B.M.	Salvaged
Untreated bridge timber	350 M.B.M.	Salvaged
Pile stubs (treated)	12,000 lin. ft.	Salvaged
Pile stubs (cedar)	3,000 lin. ft.	Salvaged
Bridge hardware	50 net tons	40 net tons salvaged 10 net tons scrap
Passenger depots, freight houses and misc. right-of-way buildings	55	Sold
Stock pens and yards	27	Sold
Water tubs (16 ft. by 24 ft.)	5	1 salvaged, 4 sold
Steel water tub towers	3	Sold
Water service pumps	4	1 salvaged, 3 sold
Oil penstock	1	Sold
Fuel oil tanks	2	Sold
Wigway highway crossing protection	1	Salvaged
Automatic signals and signal equipment at railroad crossings	3	Salvaged
Fence posts (steel)	14,000	Salvaged
Highway crossing signs and whistle posts	70	Salvaged
Farm gates	80	Salvaged
Telegraph poles	200	Salvaged
Srossarms	1800	Salvaged
Telegraph line wire	423 miles	Salvaged
Telegraph line insulators	13,000	Salvaged
Windmills, hand pumps and misc. units of equipment	27	22 sold, 5 salvaged

Preliminary Steps

With the receipt of authority to abandon operations on and to take up the line, company employees, patrons and connecting lines were advised of the plan to abandon operations on August 23, 1942, and preliminary steps were instituted to remove from the premises all unattached company materials and equipment that would no longer be required after operations were terminated. Thus, for example, on July 12, the general manager of the road asked those in charge of the line to make a prompt inventory of all company material and equipment on the line, including station equipment, furniture, grain doors and supplies, section track tools and materials, motor cars and trailers, and all other property that could be released and salvaged prior to the physical retirement of the tracks and other fixed structures generally. At the same time, he asked that all doors, windows and other openings in company buildings that might not be sold immediately be boarded up and that other necessary steps be taken to protect the property against fire, trespassers and vandalism.

Shortly thereafter, the chef maintenance officer of the road asked the division engineer having supervision over the line to have picked up and sent to the division storekeeper all surplus materials, such as emergency rails, angle bars, frogs and other track materials, not a physical part of the line and not under requisition by Metals Reserve—this step being taken so that all of this material would be out of the way prior to the stoppage of train service and the moving in of the dismantling contractor. That this request was complied with is seen in the fact that on August 1 the division engineer advised the chief maintenance officer that all surplus track materials on the line had been picked up, except that which could be loaded and moved out in 24 hours, and that he had made arrangements for the roadmaster to go through all tool houses on August 3 and to load up all tools and equipment for movement out on August 4.

About this same time also, the chief maintenance officer, in company with the division engineer and others, made an official inspection of the line and appraised the value of all remaining items of fixed property, other than the track structure, and designated whether they were to be sold, salvaged by company forces or scrapped. It was this inspection that formed the basis for the disposition of structures, equipment and facilities contained in the foregoing list.

Novel Procedure Developed

Astual dismantling of the track and bridges on the line began on August 31, at the extreme west end, when the contractor engaged for this work moved in, prepared to continue his operations progressively eastward to Linwood. The methods first employed in removing the rails, ties and bridges were not unlike those used previously on large-scale line dismantling jobs, involving a derrick car for the handling of the rails and bridge timbers,

buildings, stock-handling facilities and miscellaneous equipment on the line, a plan which was decided upon because of the greater economic value of the facilities in place, as compared with them in a dismantled state, and because of the opportunities which sale of the buildings and other facili-

and motor trucks for the loading out of ties. However, shortly after the work was under way, the contractor developed new features of operations, which speeded up all phases of the work materially, with marked advantages to all concerned.

Insofar as the removal of the rails and bridges was concerned, these improvements in operations were based primarily upon the use of a work train including three to five material cars, which were served for loading purposes by a continuous overhead cableway, capable of handling eight rails, bundles of as many as 20 crossties, and one or more bridge timbers or piles, at a time, sorting them as to grade or classification into the different cars of the train. Ahead of the work train, men with claw bars, wrenches and oxy-acetylene torches removed all except four spikes to the rail length and all but one center bolt at each joint—at the same time robbing the track of all tie plates and anti-creepers. All of this material was piled at the side of the track, ready to be loaded on to the scrap car of the train as it moved forward in the rail removal operations.

Salvaged Ties, Loaded on a Crawler Tractor, were Picked Up in Bundles of 20 by the Cableway Hoist and Placed in Material Cars

Cableway Hoist

The complete make-up of the work train, from head end to rear, included first, a flat car for loading scrap, followed by a 30-ton gasoline-engine-operated Whitcomb locomotive; a tool and supply car, which also afforded shelter for the men in inclement weather; a hoisting machinery car (a flat car), supporting the forward gallows frame of the overhead cableway; three to five gondola-type material cars; and a flat car supporting the rear gallows frame of the overhead cableway. The forward gallows frame, constructed of heavy timbers, and with a top height of about 23 ft. above the track, was hinged at its base to permit lowering, but was normally held in a vertical position by tie cables and by a line from one of the two drums of a double-drum gasoline-engine-operated hoist mounted on the same car as the frame.

The rear gallows frame, also with a top height of about 23 ft. above the track level, was supported on the rear end of the last car of the train and was inclined outward at the top over the track at an angle of approximately 30 deg. from the vertical, with its head beam about 10 ft. beyond the rear sill of the car. This frame, built up with structural steel side posts and head beam, was braced rigidly in its inclined position by means of rail-reinforced timber pole struts, anchored at the base at about the midpoint in the length of the car. Between the two gallows frames was extended a carry cable, held taut under load by the second of the two drums of the hoist holding up the rear gallows frame.

For the support and movement of materials on the carry cable, this cable was equipped with a traveling sheave fed with a load line direct from one of the drums of a second double-drum, gasoline-enginne-operated hoist located on the hoisting machinery car. Movement of this traveling sheave back and forth over the material cars, under load or light, was effected by a travel cable, extending from a fixed hitch on the sheave, backward over a pair of fixed sheaves at the head beam of the rear gallows frame, and then forward over a sheave at the top of the forward gallows frame, and thence to the second drum of the second hoist mentioned. Thus, by the operation of the first double-drum hoist, the carry cable was kept taut at all times, and by operating the second double-drum hoist, loads could be picked up by the load line through the traveling sheave, and while held at the height desired, could be moved forward to any position in the train over selected material cars.

Loading the Rails

As already mentioned, eight rails were dragged out of the track and loaded at one time with this arrangement. As soon as the work train had passed over the last eight rail lengths, the remaining spikes and joint bars were removed, and then the forward ends of opposite rails were barred inward toward the center of the track until from 12 to 15 in. apart. At the same time, a short chain sling, with a hook at each end, was hooked into the forward bolt hole of each rail, and the load line of the cableway arrangement was pulled out to a position where the loose ends of the slings on the most remote rails could be hooked into a ring at its end. Then, as the load line was hauled in and its hoisting ring passed the forward ends of the loose rails in the track, the slings fixed to these rails were hooked into it, and the rails were pulled forward toward the train in a group. Thus, in one continuous operation, eight rails were brought up to the train for loading. At the rear of the train, and without hesitation in their forward movement, the head ends of all of the rails in the group were raised simultaneously well above the floor level of the car and were pulled forward, the rear ends of the rail being dragged up on to the car over a broad, inclined metal apron, fixed to the rear of the car deck and pulled along with the train.

Continuing the forward movement, the rails were pulled from car to car to the one in which they were to be loaded. Where rails of the same classification were included in each haul, they were all loaded in the same car. On the other hand, where rails of different classifications were involved, the rails of the different classifications were dropped off into different cars as the load was carried forward, thus precluding sorting at a later date.

The force involved in the rail removal operations included 10 to 12 men on the track freeing the rails and hooking them into the load line; two machine operators on the hoist machinery car; two to four men in the rail cars releasing and piling the rails; a man stationed at the top of the rear gallows frame co-ordinating by hand and mouth signals the operations of the ground men, the machine operators and the train crew; and a general foreman directing all operations. With this organization, in open track, as many as 2½ to 3 track miles of rails were loaded out during an eight or nine-hour day.

The timbers and steelwork of bridges on the line were loaded out by the same equipment used to handle the rail. Insofar as possible, all timber structures were stripped of brac-

(Continued on page 297)

Missouri Pacific Goes All-Out to Conserve

By R. P. Hart

Bridge Engineer, Missouri Pacific
St. Louis, Mo.

Addressing the forty-ninth annual meeting of the American Railway Bridge and Building Association, in Chicago on October 21, Mr. Hart tells of the many ways in which his road is endeavoring to salvage, reclaim and otherwise conserve materials, including several unusual expedients involving steel and timber bridges. He calls for whole-hearted co-operation on the part of all railway men to the end that still further practicable means of conserving materials, in the interest of the war effort and the railways, will be evolved

MUCH is being said and done at this time about those critical materials necessary to the all-out war effort of our country, and we have been prompted to consider many substitute materials. Until the material situation has been relieved, it will be necessary for us to keep constantly before us the possibilities of reclamation and salvage in order to secure those materials required to maintain our bridges, buildings and water service facilities. My purpose here is to bring to your attention some of the things that have been done on the Missouri Pacific in this direction, with the thought that they may be helpful and suggestive to you in solving your own material problems.

All of us on the Missouri Pacific are taking the war very much to heart. Everyone, from the head of our system down to the newest messenger boy, is intent on doing everything that will speed up the war effort. Under the leadership of L. W. Baldwin, our president, we are constantly impressed with the fact that the part the railroads have to play in bringing about victory is a very great and grave one. We realize that adequate transportation will not, of itself, win the war, but we also know, as Mr. Baldwin has so often pointed out to us, that the lack of adequate transportation can contribute very materially to losing it. Every officer and supervisor is thoroughly imbued with the fact that we are all soldiers, and, through personal contacts, through frequent group meetings, and through the extensive use of circulars, bulletins and posters, everyone is kept tuned to the war effort.

Line Abandonments Will Yield Large Quantities of Bridge Steel for Reuse or Scrap

More than 1700 of our former fellow-employees are now with the armed forces. All of us have sons, relatives or close friends with the colors, so that the war does not seem remote and merely something one hears about on the radio or reads about in the newspapers. It's real and grim, and very personal. I mention this because we feel that salvage, reclamation and conservation efforts cannot be wholly successful unless they have the sincere and wholehearted co-operation of all employees, and we believe that you cannot secure this co-operation unless all employees realize the importance of these efforts, and feel that they have a personal responsibility in regard to them.

Much Accomplished on M. P.

We on the Missouri Pacific Lines are proud of what we have been able to accomplish. So far this year, our

Materials

Modified Standards on the M. P. Have Released Thousands of Feet of Inner Guard Rails From the Shorter and Lower Bridges on the Road

lines have plowed 48,000 tons of scrap back into industrial steel furnaces. Although the practice of moving scrap off the railroad and back into the channels of production has always been followed closely as a matter of good business and good housekeeping, scrap clean-ups were intensified immediately following our entry into the war.

We stopped considering scrap from a dollars-and-cents standpoint. If it costs $50 to get out $40 worth of scrap, we get it out. As a result, we have moved a vast amount of what might be called marginal scrap, and it is still moving. The same principles were applied to our reclamation practices, and we are now reclaiming materials that we formerly purchased, regardless of the economics involved, for the more we reclaim, the less demand we must make on the nation's limited supply of vital materials.

The same patriotic principle and the same desire to be of service have been and are now actuating our efforts to furnish to the government as much of the vitally needed rail as possible, without, of course, in any way impairing the effectiveness of our operations. Intensification of these efforts began with the launching of the defense program and have been pursued even more energetically since last December. Much of the rail that we have turned over to the government resulted from the extensive new rail laying program that we have carried out over a long period of years, and which it has been possible for us to continue because of orders placed prior to our entrance into the war. Some of it has come from abandoned branch lines, and some of it from tracks serving abandoned industries and unused sidings. Our search for rail for the government, however, has extended beyond these more or less orthodox sources.

Remove Many Guard Rails

Until recently, it had been our practice to install inside guard rails on all of our deck-type bridges 100 ft. or more in length and 10 ft. or more in height. This meant that we had thousands of feet of rail on our bridges for the purpose of reducing the damage that might result from derailments. To release much of this rail for tracks required in connection with the war effort, it was decided to modify our standards to provide for the installation of inside guard rails on only those deck-type bridges which have both a height of 20 ft. or more and a length of 200 ft. or more. Accordingly, a program was set up to release guard rails from all deck-type bridges which did not come within these limits.

Although we did not remove guard rails from through-type bridges under this program, we did adopt certain rules which permitted us to release part of the guard rails on some of the longer and higher deck-type bridges. On those where the track alinement is curved in excess of two degrees, we eliminated the guard rail along the high side of single track; and all guard rails, except the one next to the low rail of the outside track, in double track. On double-track bridges with tangent alinement, we eliminated the guard rails on the outer sides of both tracks. Another rule which permitted the release of additional guard rails, called for their elimination at points where train movements are at speeds not exceeding 20 m.p.h.

Under this program, we have released approximately 320,000 lin. ft. of rail of various weights, some of it having only scrap value, but most of it being adequate for use in tracks serving war industries. The program is now complete, all rail having been forwarded to points of more effective service and making up part of the 400 track miles of rail released by the Missouri Pacific Lines in 1941 and 1942 to war plants, basic industries and military railways.

Save Other Bridge Materials

For many years our company had followed the practice of providing sheet-metal fire protection over the caps and stringers of open-deck timber trestles. This practice has now been discontinued to save the metal required by such a standard. Whether we will return at a later date to the former practice regarding the use of inside guard rails and fire protection metal is undecided. However, for the duration of the national emergency, it is proposed to avoid the use of these critical materials, since we do not feel that the added protection afforded by them justifies their use under present conditions.

Other metal which it has been pos-

sible to salvage from existing structuhes consists of sidewalk brackets, pole brackets, light standards and other metal fixtures attached to steel spans and piers, and which are no longer essential. Such salvaged metal as this forms a part of the 48,000 tons of scrap which the Missouri Pacific Lines have collected.

In addition to salvaging rail and other miscellaneous metal, more careful consideration is now being given to reclaiming second-hand steel spans and beams in store yards, or which we may be able to recover from bridges on abandoned lines. Such spans or beams in their present form provide inadequate carrying capacity for modern railroad loading on main lines, but many of them can be altered so that they will provide the required carrying capacity. This can usually be accomplished by reducing their length, involving the rearrangement of their bracing and end bearings. Truss spans of light design can often be reused by eliminating one or more panels to reduce the effective span length. This may call for some strengthening of the individual members remaining in the shortened spans, particularly the floor system, but the material eliminated from the panels removed can frequently be used to strengthen the members retained in the span.

A large per cent of the bridges on our railroad are of timber construction, many of them of untreated timber. Until a few years ago we were able to secure unlimited quantities of bridge timbers suitable for use untreated, and we are now passing through a replacement cycle. In recent years, therefore, we have had a rather heavy program of trestle maintenance and replacement, for which we have needed large quantities of stress-grade creosoted timber. In view of the War Production Board's Conservation Order M-208, covering softwood lumber, we will, undoubtedly, find it necessary to resort to greater use of second-hand untreated timber. To get the greatest possible use from the limited quantities of such timber available, we are arranging to apply creosote treatment to sound sections of second-hand timbers removed from bridges because of decay at the bearings. This material, as it becomes available, will be used in the maintenance of other untreated timber structures.

Salvage Building Materials

During the last ten years some of our station buildings, due to changed conditions locally or in the operation of the railroad, have become obsolete and have been abandoned. For various reasons, some of these buildings have been allowed to remain in place, and we now find that they contain much valuable material which can be used in the maintenance of other existing stations and for the construction of needed station facilities at locations adjoining war industries. By razing such buildings, much lumber, mill work, corrugated galvanized roofing, asbestos shingles, brick, heating plant facilities, plumbing fixtures and their accessories have been made available for other work.

The brick and lumber recovered from one old building provided materials to construct a 55-ft. by 77-ft. extension to a warehouse at a nearby location, and a 30-ft. by 60-ft. shop building at another point. The materials recovered from another wood-frame building supplied practically enough second-hand lumber and millwork to construct a 38-ft. by 114-ft. building at a new location in the same town, and the excess of certain of the materials released was used to rehabilitate an existing freight warehouse.

A new station at Simms, La., serving Camp Livingston, was constructed of materials salvaged from a dismantled frame station at a point where it was no longer required, and a 48-ft. by 112-ft. warehouse was constructed in Illinois of materials salvaged from frame stations razed elsewhere. Asbestos shingles recovered from certain

Metal Tie Guards for Caps and Stringers Have Been Abandoned for the Duration

dismantled structures were also used to rehabilitate the roofs of two important main line stations.

In addition to utilizing the materials from razed buildings, a canvass of our system disclosed that many heating plants and plumbing fixtures could be released at points where changed conditions no longer made them necessary. As a result, these plants and fixtures are now being salvaged for the maintenance and repair of facilities at other locations.

In a further effort to reclaim and salvage materials, we have undertaken a program of removing underground pipe lines which were abandoned in place, some of them having been abandoned for more than 15 years. These pipe lines are mostly of cast iron, but include some black and galvanized steel pipe. At the time they were abandoned, their removal could not be justified economically. Something lik 200 tons of pipe, in sizes ranging from 2-in. to 12-in. in diameter, have thus far been recovered. Some of this was suitable only for scrap, but much of it has been reclaimed and is being re-used elsewhere.

As shipments of this class of material are received at our reclamation plant in Sedalia, Mo., all pipe is inspected carefully and usable sections of pipe and fittings are cleaned and stored for re-use. We find that some valves can be reclaimed by re-grinding and supplying certain repair parts.

Some of your older employees, even those on the retired list, may supply valuable assistance in locating these hidden "treasures," where facilities have been abandoned for a period of several years. In effecting salvage and reclamation of major materials, the smaller items should not be overlooked. Much of the hardware removed from old bridges can be reconditioned for re-use. Worn cables removed from pile drivers and other equipment can be used for clumping pile clusters at wharf and dock facilities, or for revetment work.

As to equipment, you are cautioned not to overlook the proper lubrication and adjustment of all machines, so that they will be kept serviceable for use at all times. It is no longer possible to secure the prompt delivery of repair parts.

Probably most of you have already thought of some or all of the possibilities for reclamation and salvage that I have mentioned. If not, it has certainly been worth the time required to recite them. Even if so, it may still have been worthwhile as a challenge to you to find other ways to reclaim and salvage those second-hand materials which you will surely need for the maintenance of your facilities.

As railroad men, you have probably read the recent comments of Chairman Aitchison of the Interstate Commerce Commission, to the effect that in the nationwide campaign to collect scrap, the railroads have taken the lead, and are doing a most remarkable job. This is true, but we must not rest upon our laurels and rely upon the good offices of War Materials, Inc., and other government agencies. It is our job to help, and we must keep ever alert to the possibilities of saving, reconditioning and re-using every available piece of serviceable material and equipment required in our work.

War Conditions Bring New Rail Problems*

By C. B. Bronson

Inspecting Engineer,
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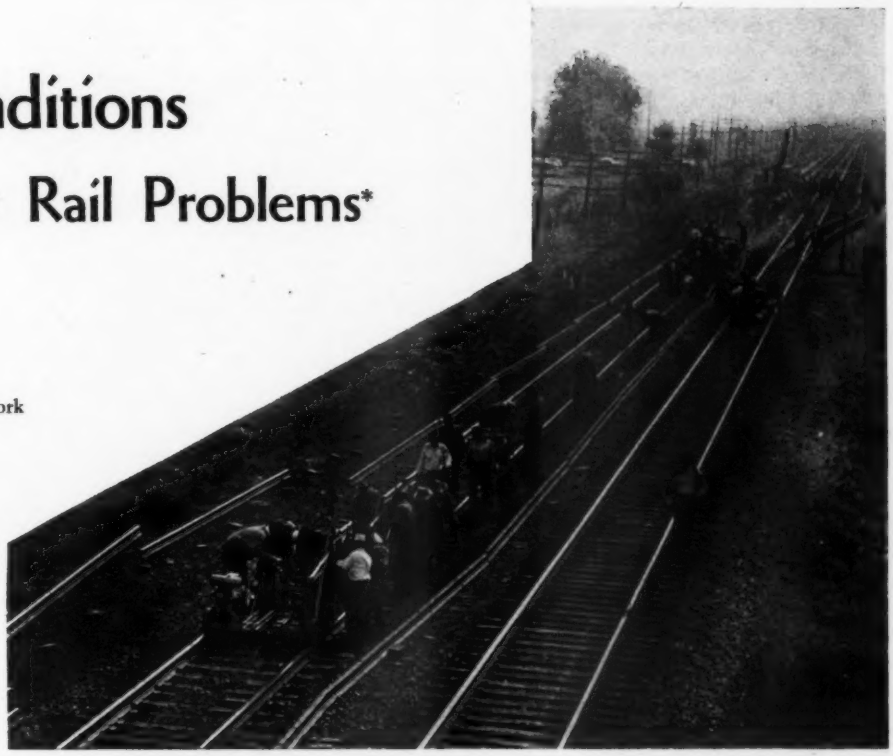


A Rail-Laying Gang at Work on the New York Central

C. B. Bronson

Proceeding from a discussion of the factors involved in developing rail-renewal programs, this article undertakes an appraisal of the situation relative to the procurement and design of rails and fastenings brought about by the shortage of steel

THE annual rail-renewal program is determined after weighing many complex factors. The problems differ somewhat on each road, but since most of them are of common origin this discussion will cover the railroads in general and not specific cases. It is largely in the nature of a review of known facts and conditions, plus those developments arising as a result of the present conflict.

In planning the rail program on many roads, a long-range consideration is the progressive change from a lighter to a heavier rail. The tracks carrying the heaviest volume of traffic are given first attention in this stepping-up process, which is continued over a period of years until the principal and important main tracks have been rebuilt to the higher standard. Most roads have pursued this policy for several years, but many miles of the lighter rail are still in service in main tracks. When large reduction in the volume of traffic occurred during the depression, there was a considerable decline in the amount of new rail laid, resulting in a slowing down of these long-range programs. As a result, the average age of the lighter rail was lengthened, thus causing its condition to deteriorate and necessitating additional expenses for maintenance.

At the same time there was a widespread demand for high-speed service, and the fulfilment of these demands has had cumulative effects in the form of wear and tear on the track structure. Moreover, the present heavy volume of business is eating more and more into the reserve strength of the rail which had been built up or accumulated during the 'twenties, and which now urgently need replenishment.

Reasons for Renewing Rail

The somewhat prevalent belief that the principal cause for renewing rail is the wearing of the rail head to the point where it becomes too thin for safety is strictly true only on certain curves and on a limited amount of tangent track. Wear, in reality, manifests itself in various ways, such as rail-end batter, decrease in depth of head, driver burns, corrugations, shelly spots, flow, distortion of the head, unevenness of the surface, worn fishing surfaces, corrosion of the flanges, and others. These cumulative conditions represent what might be more properly termed "deterioration." Another factor influencing renewals is present in cases where the stiffness and strength of the lighter rails become insufficient for the loads and type of traffic being carried. Where this happens, the efforts spent in surfacing and lining the track are lost in a relatively short time.

Again, the entire track structure may be in need of a major overhauling, including heavy ballasting, large-scale tie renewals and new fastenings. Even though the rail may still have some service life, the most economical

*Abstract of a paper presented before the Metropolitan Maintenance of Way Club, New York.

thing to do is to renew the rail, and utilize the existing rail for other locations of lesser importance. The necessity for obtaining relayer rail for secondary tracks is another important reason for laying new rail. If existing rail is continued in service in main tracks for too long a period, it becomes unfit for any further use, except possibly in yards and sidings. To permit this to happen is neither desirable nor economical.

Rails have certain physical capabilities and at the same time certain "human" faults, if the term may be so used, in that the wear and tear upon them eventually has a telling effect. Intensive loading causes batter of the rail ends, flow of the head, and abrasion of the surface metal, and coupled with these is the fatigue action caused by rolling loads. These conditions are naturally intensified as the volume of traffic increases; therefore, it is extremely important to keep abreast of the present situation.

Gage Corner Shelling of Rail on Curves in Heavy Traffic Territory Is Causing Increased Concern

Defective Rails

Still another important reason for renewing rail is the desire to reduce the number of defective rails, particularly those afflicted with transverse fissures, which have been developing in increasing numbers as the result of the heavier volume of traffic. Recently fissure failures have appeared in unexpected places, such as, for instance, on certain branch lines where a sudden revival of traffic has occurred because of the presence of new plants and other facilities connected with the war effort. This situation has created an additional demand for relayer rail to protect certain stretches of track on such lines.

Rails subjected to the controlled cooling process have shown a complete absence of fissures due to shatter cracks, the primary reason for their inception and development. The total tonnage of thermally-treated rail now in track, including that controlled cooled or Brunorized, is close to the 5,000,000-gross-ton mark, and for all practical purposes the entire output is now so specified. The added safety factor due to the absence of fissures in such steel is a particularly bright spot in the present picture.

On the New York Central we installed some 1,600 track miles of thermally-treated rails between 1936 and 1941, inclusive. To date, not a single fissure has developed in this rail, and only eight head failures have occurred. While it is fully recognized that controlled cooling will have little or no effect on the occurrence of vertical or horizontal split heads, it is quite a coincidence that failures of these types have been so few and far between in our own case.

There is still a tremendous tonnage of rail in service which has not been thermally treated and which will continue to be a problem because of the development of fissures. Many years will elapse before all such rail will have been relegated to lines of lesser importance. But an excellent start has been made, at least in re-equipping the heavier - traffic and higher - speed tracks.

We are all fully aware of the fact that at present there is a tremendous demand for steel from all sources. Allocation through the system of priorities was of necessity both intricate and difficult to administer in order to equalize demand and output, but the system as now worked out and in effect should afford a better balanced condition. In the case of rail now in track, all known ways and means are being taken to prolong its service life and to minimize the necessity for purchases of new steel, but there is a limit to which such corrective measures can be carried out.

Delivery Timing Important

The time of delivery of new rails is an important consideration, especially for the roads in the more northerly sections. To obtain the maximum benefit from new rail, and to avoid unduly punishing or abusing it, it is highly essential that the spacing and renewal of the ties, and the raising and surfacing of the track, be completed before the weather becomes so severe as to prevent the continuance of this very important secondary work. The rails will sustain a certain amount of injury to their line and surface, which cannot be fully restored, if they are laid in the late months and are not properly cared for until the following spring. This is especially true in view of the tremendous volume of traffic now moving.

The rail mills have likewise had troublesome conditions to contend with. They have been pressed from all sides for deliveries, and have had to wrestle with many production problems and schedules to obtain the maximum possible output. Some mills were confronted with orders of considerable urgency for fairly small lots of rails of certain sections. These were handled by re-grouping them into a continuous rolling schedule. Again, from time to time urgent orders of tonnages for the war effort have appeared suddenly, which have taken precedence over everything else.

No New Sections

It has been fully recognized by the railroads that no new types or designs of rail sections should be presented to the mills for the duration. Also, efforts have been made to reduce or eliminate as many existing sections as possible. This, however, is difficult to accomplish, especially where tracks have been equipped with hundreds, or even thousands, of miles of a certain type and weight of rail. The question of fixtures and fastenings must also be taken into account. Where the necessary rolls are now available, the roads are able to obtain the same sections as furnished in the past without undue hardships on the mills. It is important to avoid ordering small tonnages of little-used sections, for the necessity of making roll changes to produce such tonnages is a source of delay. Most roads, however, have concentrated purchases on the heavier weights of rail and have filled requirements for lighter rail with relay rail.

(Continued on page 294)

Locating Pipe Lines and Leaks with Mechanical Detectors

The various types of devices that are available for this purpose, and the manner in which they are used, are described in this abstract of a report prepared by a subcommittee of the Committee on Water Service, Fire Protection and Sanitation of the American Railway Engineering Association. J. P. Hanley, water service inspector, was chairman of the subcommittee which prepared the report

SEVERAL general types of equipment are used for detecting leaks and locating buried water pipes. The pitometer is used extensively by the larger cities as a measuring device for detecting unusual water use in a certain district. After the leaking area is definitely located, the various leaks are traced to the point of origin by contracting the limits of the survey. Such surveys are usually made by an engineering party and are expensive.

Railways make considerable use of regular and auxiliary water meters in the detection of leaks, as the reading of master meters in terminals at regular intervals affords a ready means of noting any unusual discharge. Whenever a leak is thus indicated, auxiliary meters are placed on branch pipes or sections independent of the master meter, and leaks are detected in such sections by closing all or nearly all outlets and observing the meter registration during the check. This method has enabled railways to discover and eliminate many hidden leaks.

Types of Detectors

Depending on the manner in which the presence of leaks is made known, detectors may be classed as visible or audible. The visible form of detector operates by electric or magnetic means, the action being transferred to a dial that is visible to the eye. It has the advantage of not being affected by noises such as attend railway operation. The audible detector operates through the agency of electric or radio equipment, the impulses being delivered to a single or double ear piece resembling a telephone receiver, and the proximity of the leak is indicated by sounds of varying intensity, which can be interpreted by a properly trained operator. There is also a combination detector which combines the audible ear phone and the visible dial indication.

Probably the best-known form of the visible detector is the "dipping needle" which operates on the magnetic principle and indicates buried metal pipe and valves when the device is carried sufficiently close to them. This device is constructed in several styles. One of these has an extension rod which permits the searcher to walk upright with the magnet close to the ground. Another style has a shorter grip attachment, while still another has a carrying case and is borne slowly over the area under investigation by the operator who remains in a stooping position. The "dipping needle" is used for locating pipes, but will indicate the presence of any ferrous metal within its range.

The Water Phone

A simple form of the audible detector is the "water phone," which consists of a single telephone ear piece with an extension rod of varying length for contacting the pipe, or for insertion in the earth near the assumed location of the buried pipe. At each station the searcher listens for the sound of running water and moves from station to station until he has established a location where the sounds are relatively clearest, at which point a sounding rod may be inserted in the ground to determine the actual position of the pipe. An improvement over the single ear phone is the double ear phone, with a clamp which fits over the searcher's head and leaves his hands free to operate sounding rods or other accessories. This device may be converted to a "transmit-o-phone" and used as a pipe line locator by listening for sounds transmitted from distant exposed sections of the pipe, hydrants or other connections when these are struck with a hammer.

Radio Detectors

In addition to the simple forms of detectors mentioned there are many sets on the market that are more elaborate, which may cost up to several hundred dollars. These sets usually operate on the radio principle, with tubes, wet and dry batteries, sound amplifiers and filters. The sets usually have a vibration microphone and high-gain amplifier which may be attached to a hydrant or an exposed part of the water main. The vibrations induced by leaking or running water are greatly amplified, and the sounds of varying intensity are recorded by a sensitive meter which may be calibrated to impart visible dial indications, as well as the sounds transmitted by an ear-phone attachment. The visible dial indication is of decided advantage in noisy locations. This instrument may be used as a pipe locator by adding an energizer, which consists of an induction coil, battery, switch and wiring. It is used to indicate pipe line centers when the self-induction in the main is too low. The use of induction on a particular pipe line permits it to be followed when other pipe lines are nearby on which no induction is used.

Procedure

In locating pipe lines or leaks, the usual method of operation is to set the sensitivity control at a certain constant and then attach the microphone to a hydrant, service outlet or other suspected point. If the audible or visible indicators show no deviation from the constant, indicating that there is no nearby leak, another listening station may be selected. If the indication shows leakage, readings are taken on each side of the original listening station, and the leak or pipe line is located by following the higher readings. When the location of the leak has been definitely established, a sounding rod may be inserted for contact with the pipe or a hole excavated at the site. The survey party should be furnished with the best available map or diagram of the piping system in the vicinity and should organize an orderly search, marking each area or section surveyed as the work progresses.

Instructions issued by the detector manufacturers should enable a trained searcher to determine the depths of pipe lines and locate leaks, buried pipe lines, dead ends, branch mains, valves and unknown metal hazards in the paths of excavating machines. Emphasis should be placed on the use of the word "trained" searcher in the foregoing sentence, as an untrained man not familiar with the varying sound intensities, the equipment, or the general principles involved will accomplish very little, and the results ob-

tained through the use of the costly device in such hands will be disappointing.

Pavement Helps

In searching for leaks in water lines, it should be understood that sound vibrations are transmitted better when both the receiver and the transmitter have metallic connections with the pipe. A fire hydrant or service box affords a convenient connection for the receiver contact, but in the process of detection it is necessary to move the transmitter ahead 30 or 40 ft. over the assumed location of the pipe for each "listen-in" until the proximity of the pipe line or leak is indicated by a perceptible increase in the volume of the signals. The presence of a pavement over a leak is a definite aid in detection as it acts as a sounding board. On the other hand, a plain earth cover, being a poor sound conductor, does not react as well. The pipe itself is the best sound conductor if it can be reached with a sounding rod on which the transmitter can be placed.

Many industries, utility companies and municipal water departments use leak detectors to good advantage. If such sets are selected with care after an investigation to determine the type best suited for the requirements, they will prove of value in preventing water waste. In order to secure good results on railways, it has been found necessary to train a selected number of the personnel in the proper use of the equipment. There are several reputable manufacturers who sell and service such equipment and are willing to give instruction in its use. Some manufacturers also make surveys of underground pipe systems with the detectors and are willing to train the purchaser's employees while making the survey.

Conclusions

1. The simpler forms of leak and pipe locators, such as the magnetic needle and ear phone, are widely used and have proved useful to railway water service men. These devices are light and can be carried readily by the maintainer.

2. The more costly detector sets of the radio type are not used extensively by railways, and the results secured from them have not generally been satisfactory. However, this may have been due largely to inadequate training of the operators or failure to select the most suitable equipment.

3. The detectors are considered necessary equipment by many industrial plants and municipal water departments. Purchases by railways should be contingent on a careful investigation to determine the type best suited to the requirements. Arrangements should be made at the time of purchase for the instruction of the railway maintainers in the effective use of the equipment.

New Rail Problems

(Continued from page 292)

The heavy demands for steel from so many different sources has led to uncertain delivery schedules and has caused cancellations on short notice. This has had a reactive effect on track work, with the result that in some instances tie-renewal and ballasting programs have had to be revised.

Material shortages created by the war emergency have brought about certain problems for the steel makers, involving the composition of steel, with reference particularly to the more vital alloys, although certain changes have had to be considered in railroad track materials also. The present well-balanced composition of rail steel, arrived at after many years of experience, has not been changed.

No adjustment in composition has been necessary in such items as joint bars and track bolts. However, considerable quantities of spikes and tie plates are now made from Bessemer steel, in place of open hearth steel, while copper, of course, is out of the picture. The use of alloys in tools and in certain special track fixtures has, in general, given way to the high carbon or forging grade of steel, heat-treated by various methods, depending on the service or application of the particular product.

Frogs Cause Concern

Hard-center or manganese-insert frogs have caused concern due to the fact that sizable amounts of ferromanganese are needed in their manufacture. Anticipating the possible shortage of this alloying element, consideration has been given to the use of built-up types of frogs as substitutes, and also to the possibility of conserving manganese by changes in design. The present designs are the result of prolonged study, combined with service experience and have been reinforced at critical points as weaknesses have developed. The built-up type could not be used for high-speed turnouts without serious detriment to operation, and this might even be true for some sharp-angle turnouts. However, engineers have continued their studies to prepare for any eventuality.

Regarding certain track fastenings, attempts have been made to standardize on a minimum number of designs. The tie plate constitutes the most promising field for these efforts. Many more types and designs of plates are now being rolled, even for the same weight of rail, than seem justified, and this applies also to the multiplicity of punching practices. The present is considered an opportune time for an aggressive weeding out of as many designs as possible.

Studies are also progressing to determine what changes in dimensions of the tie-plate sections can be made to save metal. Of course, while the present stocks of rolls, tools and dies last, the manufacturers are in a position to meet the demand. But the stage may soon be reached where the stocks of such equipment may become depleted, and it is for this reason that intensive studies are being carried out with the purpose of reducing the number of designs and types of punching. The joint bar is still another example of the efforts that have been made to reduce the number of sections, though rolls and tools are available for sections now ordered.

Problem of the 24-In. Bar

Perhaps the most important development in track materials is the order making it compulsory to use the 24-in. bar for new rail. The effects of this order have been particularly severe on several trunk lines using the heavier rail sections. It is only within the last few years that some roads have adopted the longer bar, after having had years of experience with the 24-in. bar, usually as a suspended joint. Because of the difficulties encountered in maintaining the short bars, the 36-in. bars gained rapid favor for us on heavy or concentrated-traffic territories. To revert to the previous type of construction was naturally felt to be a backward step, and so it was, but steel must be conserved in every way possible.

The effects of the change to the shorter bar were felt more severely on the New York Central than on any other road for the reason that the 36- or 38-in. bar, used as a three-tie supported joint, had been standard on the Lines east of Buffalo for 50 years, and on other portions of the system for over 25 years. It will now be necessary to use a two-tie suspended joint with the 24-in. bar, which means that the longer bar cannot be used again when conditions return to normal without respacing the ties and disturbing the ballast bed considerably, thereby entailing considerable expense.

Applying Joint Bars to Rail

By W. E. Gadd
The Rail Joint Company, New York

WHEN applying new joints to new rail, the first and most important requirement is to make sure that there are no burrs, sharp edges or other imperfections that will cut into the contact areas of the bars or prevent them from being fully seated. To eliminate this possibility and thus insure a fishing fit, it is now standard practice on some roads to have the fishing surfaces of the rail ends ground at the mills. In any event, before the joint bars are applied, the rail ends should be cleaned and oiled, preferably after the rails have been set in place on the ties to prevent their becoming fouled with particles of dirt or ballast and affecting the fit of the joint bars.

It is of extreme importance that the proper sequence be followed in the tightening of the bolts, to insure that a perfect application of the joints will be made. In making the application, it is suggested that, regardless of the number of bolts in the joint, the center bolt be tightened first, to be followed by the intermediate bolts, if a six-hole joint is being used, and finally by the end bolts. To guard against the cocking of head-contact bars, that is, failure to seat squarely, while the bolts are being tightened, the *bases* of the bars must be driven inward.

Where a power bolt-tightener is employed, as with a rail gang, the operator should carry a light hammer for this purpose, as this will be heavy enough under ordinary conditions. It should not be overlooked by maintenance officers that, even with close supervision, certain designs of joint bars might be applied and the bolts tightened with the bars in a cocked position, for which reason this is a matter which should always be watched closely. Where this has occurred, the only remedy is to loosen the bolts, square up the bars and retighten the bolts.

How Many Tightenings?

Next comes the question of bolt tension. While the importance of this subject is generally recognized, it is highly controversial, especially with respect to the magnitude of the tension. On the other hand, there is general agreement as to the value of uniform bolt tension. With the advent of power-driven bolt tighteners there has been a tendency on a number of roads to decrease the number of bolt tightenings after the application of the joints.

When bolts are tightened by hand, it is customary to go over them two, or more often three, times following the original application, before the job is considered to be completed. Experience has indicated, however, that even where the bolts have been tightened with power wrenches, the initial bolt tension may fall off quite rapidly within the first week or ten days. This results from the disintegration of mill scale and foreign substances that may be on the fishing surfaces, and from the seating adjustment of the bars through the forces imposed by the moving wheels. For these reasons, it is desirable that, even where power-wrenches have been employed, the bolts be retightened two, or preferably three, times following the original application of the bars.

To insure uniformity of tension, it is recommended that the machine be set to give a low tension for the first tightening. Obviously, this should be sufficient to prevent longitudinal movement of the rails by reason of expansion and contraction under temperature changes, until the rails have been anchored. Incidentally, to prevent the possibility of such movement, the anti-creepers should be applied as soon as the bolts have been tightened. At the time of the second tightening, the setting of the machine may be such as to provide for an intermediate tension. The third or final tightening should not be given until all of the track work has been completed. At this time, the machine should be set for the ultimate tension desired.

New Joints to Old Rail

In general, the same procedure should be followed when applying new joints to old rail. However, prior to the application, a careful study should be made of the rail ends. The fishing surfaces should be measured to ascertain whether a full or oversized bar will be necessary. If excessive wear is found close to the ends of the rails, joint bars with a center overfill should be employed, the overfill being either vertical or lateral, depending on the type of joint selected.

If the rail on curves is badly worn and there is a possibility that the heads of the new joints will interfere with wheel flanges, it may be desirable to transpose the rail. If the rail flanges are corroded appreciably just beyond the old bars, it is sometimes desirable to reduce the length of the new bars by approximately one inch to insure a uniform bearing on the rail base. This will avoid the possibility that the new joint will not fit into the worn portion of the rail, and is of particular importance if joints with oversized fishing are to be used. In this connection, it is well to emphasize again the desirability of lubricating the rail ends, since this facilitates the application of the joint bars and the tightening of the bolts.

If the rail ends are to be built up, as is usual when new joints are ap-

With the Advent of Power Bolt Tighteners, There Has Been a Tendency to Decrease the Number of Bolt Tightenings After the Application of the Joints

plied on old rail, the track should be lined and surfaced after the new joints are in place. Until this is done, neither welding, grinding nor any other work on the rail ends should be done. Where the rail ends are built up before the old joints have been removed, irregular surface, wasted material and high joints are likely to result.

Some roads make a practice of cropping rail ends and drilling new holes for the bolts. Where this is done, the same general rules hold good for the application of new joint bars. If the rail is very old and is corroded considerably, however, the use of oversized bars may be necessary, but this is the exception rather than the rule.

Frequently, rail is found which is in very good condition and has lost very little in cross section, but which requires some joint attention. Due to slight batter and slight fishing wear, it is not necessary or desirable to crop the ends. In such instances it has been found economical to replace the original four-hole joints with six-hole joints, by drilling two additional holes to accommodate the new joints. As the result of this method of rehabilitation, the service life of the rail is greatly extended, while at the same time producing better track conditions with reduced maintenance.

How to Jack a Pipe Culvert*

By J. P. Dunnagan
Engineer of Bridges, Southern Pacific, San Francisco, Cal.

IN preparation for jacking a pipe culvert through an embankment, the first and most important consideration with respect to the jacking procedure is to examine the materials in the embankment to determine whether jacking is feasible. If the cover over the pipe is adequate, clay, clay loam, most loams or solid rock will hold a face, and hence will offer little or no obstacle to the jacking of the pipe. Sandy loams, gravelly soils and sand tend to sift down and bind the pipe. Jacking through such materials should be attempted only after extra precautions have been taken to keep the pipe free from them. It is rarely, if ever, practicable to jack a pipe through pure sand. A high water table, while not a positive bar to jacking, does complicate the job materially, and pumping to control the water is usually necessary. Where local conditions are too unfavorable, tunneling or an open trench should be considered, rather than jacking.

Next in importance is the question of adequate jacking backstops and adequate jacking power. One should never temporize with the former, since failure of the backstops will almost certainly result in the sticking of the pipe. The additional labor effort necessary to free a pipe frozen in this way far exceeds that required to build more substantial backstops in the beginning.

Considering the jacks, it is desirable to have two 10 to 20-ton jacks when beginning the job, when the pushing is comparatively easy, for these jacks are much faster than those of greater capacity. If the pipe is being jacked through a stable soil, it is possible to go a considerable distance with these lighter jacks. Two 25 to 50-ton capacity ratchet screw jacks should also be available for use when the going gets heavy. Hydraulic jacks do not operate well when on their sides, for which reason they should not be used for jacking culverts. Air jacks require too many furnishings for this kind of work, because the actual jacking time is not long or the jacking operation difficult.

It is necessary to erect substantially heavier backstops and lining timbers when jacking rigid pipe than when installing corrugated pipe, and to provide three or four times the jacking capacity. For the same reason, shorter lengths of barrel should be used and tongue and grooved rather than the bell-and-spigot type of pipe should be chosen for jacking.

Arrangements to work four or five-men gangs, depending on whether the assistant foreman works, in shifts has an important bearing on the success of jacking pipes through embankments, as this will eliminate the necessity for allowing the pipe to remain unmoved for considerable periods. After the job is started it may be found that the soil holds a face so well that only one shift per day is necessary, but this is not a usual situation and even if it does occur, the pipe should not be left unmoved over a week end or a holiday. Next to backstop failures, more pipes have become stuck as a result of failure to prosecute the work in shifts than from any other cause. A rigid-pipe jacking job should never be planned otherwise than as a continuous three-shift job.

Other Precautions

Other precautions that expedite jacking include careful excavation at the head end, and care to assure that the pipe remains on true alinement and grade as it advances; provisions for field riveting, including an air hammer if available to lessen the time of this operation; and arrangements for night lighting. If the job is undertaken during the rainy season, or when rains can be expected during the progress of the work, a canopy should be provided to cover the working pit.

If the cover over the pipe is light—that is between 4 ft., the usual minimum, and 9 to 10 ft—stringers should be placed under the ends of the track ties to cushion the vibration from

Adequate Jacking Backstops and Adequate Jacking Power Are Essential to Prevent the Sticking of the Pipe.

*This discussion was submitted for publication in What's the Answer department in answer to a question about what preparatory work is necessary for jacking pipe culverts through embankments, and the equipment and force needed to do this. Because of its comprehensive character it was withheld for presentation here as an independent article. For further discussion of the subject see page 354 of the May, 1942, issue.

moving trains. Where the soil is light or loose, sheets of smooth thin-gage metal should be bolted or wired to the top of each section of pipe as it enters the embankment, to lessen the top friction. Pockets 6 in. deep, at 3 or 4 ft. intervals, should also be dug just below and on either side of the bore when jacking through such soils. These latter precautions become more important when jacking the longer barrels, say from 90 up to 200 ft., the latter being the maximum length considered practical.

Air hammers are required where solid rock or large boulders are encountered. Air spades can be used to advantage in excavating stiff clays. In the usual run of soils, however, short-handled picks and shovels are the only excavating tools required. In pipe sizes from 30 in., which is the minimum in which a man can work effectively, to 42 in. inclusive, the excavated material must be removed by some sort of skip or dolly buggy, which is pulled back and forth on plank runways by means of ropes. Where the pipe is 48 in. and larger, wheelbarrows can be used to remove the muck directly from the pipe. In placing pipes larger than 72 in., other methods, such as tunneling, will usually be more economical than jacking.

Jacking Gang Organization

Four or five men form a convenient-sized gang. One man does the mucking at the head end of the pipe; one man directly behind him loads the skip or wheelbarrow; and the remaining two or three men dispose of the muck, set the blocking and the jacks and do the jacking. This latter operation requires only a short part of the time involved in the operation as a whole. The speed with which the job progresses usually depends on the progress made by the mucker. All hands assist in the field riveting when the joint connections are being made.

The labor provided for jacking a rigid pipe should be seven or eight men to each shift, because the sections to be handled are so much heavier, as well as because of the greater jacking effort that is required. Hoists, cranes or other power-handling equipment are quite desirable where heavy pipe sections must be handled.

Assuming adequate cover, the jacking of pipe through embankments is feasible in about 75 per cent of railway fills. Where this method is practical, the labor cost is almost always much less than that involved in the open trench installation. It also has the added advantage of not interfering with the track structure and of eliminating interruptions or delays to traffic. On heavy grades or "hot" tracks, this latter consideration is often of sufficient importance to be the deciding factor in favor of the jacking method. Where soil considerations prohibit jacking, tunneling, using some form of metal or timber liner, should be explored and, if feasible, will have the same advantages as jacking over open-trench methods.

North Western Line Abandonment

(Continued from page 287)

ing and guard rails prior to the arrival of the work train. Final unbolting was started immediately after the passage of the train, and then the structure was literally torn apart by the loading equipment, separating the individual members for convenient handling and stowing in the cars. However, in the actual loading of the members, frequently as many as four or five pieces were bound together by chain or cable slings and handled at the same time, being dragged forward over the train to the appropriate cars for loading.

In the case of pile bridge structures, the piles were cut off close to the ground line and those lengths to be salvaged were loaded into the cars of the train in the same manner as deck and frame bent members, usually two or three at a time. That this work was carried out effectively and with little lost motion is seen in the typical example of one five-span pile bridge, which was dismantled and loaded into cars in 90 min. working time.

The members of steel bridges were frequently burned apart for convenience in handling and loading, but a number of the smaller I-beam spans were loaded out as units for subsequent dismantling, to save time in the field, employing the equipment used in loading rails and bridge timbers.

Removing Crossties

Two methods were employed to remove those crossties to be salvaged —again in the interest of speeding up and reducing the cost of the work. One of these involved the simultaneous removal and loading of the ties with the rails, employing a specially equipped, heavy-duty, crawler-type tractor, while the other method involved the more ordinary use of a motor truck, entirely independent of the rail removal operation. In the former method, the tractor employed was equipped with a strong steel rack on its rear end, staked on one side to support the ties as loaded longitudinally, and capable of holding approximately 20 ties. In this method, just as soon as a group of rails were started forward for loading, a force of 10 to 12 men turned over for inspection all those ties that looked worth salvaging and loaded those selected on to the tractor rack—the tractor backing up as the ties were picked up.

When fully loaded, which was generally accomplished well before the rails removed from the track were properly loaded in the cars, the tractor was backed up to the rear of the train. Here, a sling was wrapped around the ties and the bundle as a whole was lifted by the hoist line of the cableway and carried directly to cars assigned for loading ties. Where necessary, two or more such loads of ties were picked up and loaded before the train was pulled ahead.

As long as space remained in the tie cars, this method of loading the ties continued, with little sacrifice in the speed of removing the rails, while affording several advantages in the removal of the ties. When the tie cars became filled, the rail removal work was carried ahead progressively, independently of the removal of the ties, until the rail cars were loaded to capacity, the ties being left behind to be picked up later by the second method employed—the hand loading of them on to a large motor truck, for subsequent transfer to cars up ahead on sidings, for ultimate movement to other points on the road. In all of the tie loading operations, only those ties with an estimated remaining life of five years were picked up, the others being allowed to remain in the roadbed as the property of the contractor for subsequent disposal locally.

The setting out of loaded cars from the work train and filling out with empties required the lowering of the forward gallows frame and the dismantling of the cableway, but these operations were relatively simple, and the time required by them was offset many times by the saving made in loading operations.

The dismantling of the Hastings line was carried out under the general direction of B. R. Kulp, chief engineer and E. C. Vandenburgh, engineer of maintenance, of the Chicago & North Western, and under the direct supervision of A. A. Colvin, division engineer, who was represented in the field by inspectors to check and pass on all materials to be salvaged. The contractor handling the work, and which developed the methods employed, was the Hyman-Michaels Company, Chicago, which was represented on the job by Thomas Scherer, superintendent.

What's the ANSWER?

Section or Extra Gangs?

In view of the probability of an acute shortage of track labor this summer, is it now preferable to renew ties with section or extra gangs? Why? What are the advantages? The disadvantages?

No Change Contemplated

By J. C. Patterson
Chief Engineer Maintenance of Way, Erie, Cleveland, Ohio

We do not contemplate any change in our present practices. Where the ties are to be renewed in connection with out-of-face work, they will be installed by the extra gangs assigned to do the out-of-face work. The "dig-in" ties will be installed by the section forces. As our section gangs consist of two or three laborers and a foreman, the shortage of labor will not be felt on the sections, but in the extra gangs engaged in out-of-face work. As our tie renewals are running about 80 to the mile, we expect no difficulty in completing our tie-renewal program. Under this system of tie renewals, no extra labor is required for the "dig-in" ties, and labor for the out-of-face work is at the minimum.

A Separate Problem

By C. M. Chumley
Engineer Maintenance of Way, Illinois Central, Chicago

Whether ties are renewed by extra or section gangs this year will depend on the availability of labor. In some places it probably will not be possible to employ more men locally than will be needed to patrol the track and smooth the surface and do such chores as fall to the lot of section men. This will make it necessary to bring in extra-gang laborers in camp cars to apply ties and other out-of-face work.

At other places, where there are no defense plants or other large employers of labor, it may be possible to build up section gangs large enough to renew ties on adjoining sections as well as on their own. Where such a situation exists and it is not desirable to enlarge section gangs, "bucket" gangs may be organized for work within economical running distance from the town where such labor is available. These "bucket" gangs are composed of men who will not leave home to live in camp cars. The situation in each community is going to be a separate problem this year, to be solved to the best advantage of the railway by alert supervisory officers who can change their plans and organizations quickly to meet prevailing conditions.

Eliminates Extra Gangs

By Julius M. Bischoff
Office Engineer, Terminal Railroad Association, St. Louis, Mo.

One of the effects of an acute shortage of track labor this summer will be to eliminate extra gangs, which will confine the maintenance of tracks to small section gangs, thereby restricting the renewal of crossties to spot renewals. Spot renewals by section gangs will be preferable as well as imperative, because both crossties and labor will be scarce. Moreover, spot renewals will make the best use of both labor and material, in that the total trackage will be maintained more uniformly, since only unserviceable ties will be removed.

When extra gangs are used for renewing ties, the renewals are generally made out-of-face, resulting in the removal of ties that still have some service life remaining. This method should not be pursued when

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in June

1. When laying rail, what details should be given particular attention when it is being laid, to conserve the rail and insure longer service life? What is the importance of each?

2. In what ways can the use of critical materials be reduced or avoided in the installation and maintenance of roofs and roof drainage? What are the limitations?

3. What power tools can a section gang make effective use of? Should they be assigned permanently? Why?

4. What measures should now be taken that would not be justified normally, to avoid slow orders while repairs are being made to trestles? To steel spans? What precautions should be observed?

5. In view of the impending shortage of ties, what changes should now be made in the practices relating to tie renewals? Why?

6. What methods can be followed to prolong the life of leather, rubber and cavas belting?

7. In this period of labor shortage to what extent is it practicable to defer the widening of embankments and the cleaning of cuts? What will be the effect of such action?

8. To insure against failure of power plants, how often should chimneys and lightning protection be inspected? Who should make the inspection?

every tie must give maximum service and when labor should be used for only necessary work.

May Be No Extra Gangs

By George Stafford
Section Foreman, Canadian National, Redland, Alta.

During 1942, difficulty was experienced in recruiting extra gangs to their full strength in Western Canada and most gangs operated at about 60 per cent of their authorized strength. In addition, the labor itself was not up to the standard of former years, the average age being around 55 to 60 years. While local labor was not plentiful, less difficulty was experienced in getting satisfactory section labor, and most gangs were able to maintain their full strength throughout the working season.

At present the labor problem is becoming still more aggravated and, if the experience of last year is any criterion, this year will see the practical cessation of extra-gang activity in this part of the country. If this contingency does arise the probable solution will be to augment the section forces with the labor available and let them renew the ties. Certain benefits will accrue from this fusion of the forces, for the men who have no experience in routine maintenance will acquire some skill from contact with the trained workers in the gang, and those employees who are below par physically can be assigned to the less arduous tasks.

Extra gangs labor under the disadvantage of requiring extra foremen, time keepers, camp facilities and additional motor cars. The principal handicap to the section gang is that too much time is diverted to other than maintenance work and to such items as track inspection, care of switch lamps, etc. Where these latter items are cared for by an organized system of track inspection there should be a marked increase in the time devoted to productive work.

Substitutes for Metal Pipe

To what extent, if any, can concrete and vitrified pipe be employed as substitutes for metal pipe in plumbing installations?

Must Be No Leakage

By C. R. Knowles
Superintendent Water Service (Retired) Illinois Central, Chicago

Formerly much of the pipe in plumbing installations was of lead, but in recent years lead pipe has been replaced almost entirely by galvanized wrought-iron and steel pipe; by copper and brass pipe for pressure and hot-water lines; and by cast-iron and black and galvanized wrought pipe for sewage-disposal lines and for vent pipes and stacks. Copper and brass pipe are used in many of the more modern plumbing installations. Plumbing pipes are usually concealed in the partitions or walls wherever possible in modern plumbing practice. Exposed piping under fixtures, such as wash basins, lavatories and gravity flush tanks, is usually chrome or nickel-plated brass pipe.

Soil, waste and vent piping must be both water and air tight. Each fixture is provided with a water-sealed trap between the fixture and the waste or soil pipe. To protect these traps against gas pressure or syphoning, a system of piping is sometimes connected to the sewer side of the traps and carried above the roof of the building. This not only prevents syphoning but it also disposes of any sewer gas that may enter the system.

Wrought or cast iron is generally used for this purpose and, as this pipe is subject to little or no pressure, there is no apparent reason why concrete or vitrified pipe cannot serve this purpose if it can be obtained in the proper sizes and can be adapted to the required fittings, provided its use does not violate the building code of the community in which the facilities are located. Asbestos cement pipe is also well adapted to this service.

Soil and waste piping may be subjected to a certain amount of pressure, depending largely on the height of the facilities above the sewer and the amount of waste handled. Obviously, the use of vitrified-clay or other sewer pipe for soil and waste disposal is limited to gravity flow, or to very low pressures. In other words, this pipe would not be suitable in high buildings and, as with the vent piping, must meet the requirements of the local or state building code. Concrete or asbestos cement pipe designed for use under pressure should serve as well as other pressure pipe.

Concrete and asbestos cement pipe are not made in sizes small enough for the water lines supplying plumbing fixtures. However, there appears to be no reason why the recently-developed plastic pipe should not be given consideration as a substitute for metal pipe under certain conditions. In fact, plastic pipe may prove to be more satisfactory in some cases because it is lighter in weight than metal pipe; it does not corrode and is not affected by many acids; it is also much less subject to incrustation. One of the principal objections to its use is that it is more expensive than the pipe now used. Compared with the saving of critical materials, however, this may be secondary. The cost is, roughly, about double that of galvanized genuine wrought-iron pipe or about four times the cost of galvanized steel pipe.

Plastic pipe, made under the trade name of Saran, has many unusual properties. It is tough, durable and resists corrosion, abrasion and incrustation. It is lighter than other pipe, weighing approximately one-fourth as much as standard iron pipe. It may be welded readily at relatively low temperature, 350 to 400 deg., by using a hot plate or a blow torch. It can be threaded with standard pipe dies and is adapted for standard fittings. A limited number of plastic fittings, such as tees, elbows, flanges and couplings are on the market. This pipe is not suitable for carrying hot water or other liquids at temperatures above 175 deg.

Vitrified clay pipe designed to withstand pressure heads of 100 ft. is now under development. Experiments are also being conducted with a combination pipe consisting of vitrified clay, concrete and cast iron. This pipe comprises several sections of vitrified pipe, prejointed with bituminous material and has short pieces of bell and spigot cast iron at the ends. The assembled pipe is encased in concrete, except the spigot end, which provides for jointing in the same manner as standard cast-iron pipe.

Not Much Opportunity

By Supervisor of Water Service

There is not the same opportunity for saving critical materials in plumbing that can be found in some other fields. For instance, water lines constitute an important item in plumbing and neither concrete nor vitrified clay pipe is made in the required sizes for this service, while the vitrified pipe as now made could not withstand the pressures involved in many installations. The same is true with respect to the drain pipes from lavatories, sinks and similar equipment.

On the other hand, I see no bar to the use of either concrete or vitrified clay pipe for use as soil pipe and for vents and stacks in cases where the cast iron pipe cannot be obtained. Obviously, a stack of vitrified pipe cannot be used in a tall building and there probably will be some limitation on the height of a stack made of concrete pipe. In any event, before this form of construction is decided on, it will be well to find out whether it will be permitted under the state or municipal code.

Who Should Sort Scrap?

In view of the present difficulty of obtaining materials for track maintenance to what extent should section forces sort and classify the scrap they collect and retain materials that can be reused? Who should be the judge of their usability?

It Was Former Practice

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

Formerly, it was the custom for the foreman to sort and classify all of the smaller items of material, except car and locomotive scrap, that he picked up along the track or that accumulated during his work, and anything usable was kept on hand until it was needed. At that time the supervisor and foreman jointly judged the usability of the material so segregated.

Today many roads have reclamation plants specially organized to salvage and reclaim usable materials. Since such a plant is in far better position to do the reclaiming than any section organization, all scrap should go to this plant. On the other hand, if the foreman picks up usable material that he is short of or will need in the near future, he should retain and use it instead of transporting it to the reclamation plant and back again to the point of use. This will save not only a lot of time but the expense of considerable bookkeeping.

Do Not Scrap

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Reusable material should not be placed in the scrap bin, but should be segregated and put in a separate container at the time it is picked up. Much can be gained by careful and thorough training of foremen in the use of materials. This will not only save material, but will largely eliminate the scrap that is now created on many sections. I have often seen foremen allow their men to drive bolts through joint bars in which the holes were not lined correctly, thus destroying the thread and making the bolt unfit for further use. Failure to set track spikes vertically and square with the rail, with subsequent bending of the spike against the rail, is wasteful and causes the spike to fail to serve the purpose for which it was intended. When spikes are set improperly in prebored ties, one side of the hole will be cut out, and in a short time the spike will become loose and serve no purpose. Ties spaced with spike mauls or sledges will be damaged and soon start to fail.

A well-trained foreman and the men under him will eliminate waste and damage to all materials and tools in their charge. This reduces the amount of scrap to be collected, since both materials and tools that have received proper care will last longer and thus will not need to be renewed or replaced so often. When a rail fails and is removed, it should not be reused until instructions are received from the division engineer or roadmaster.

Where the right kind and amount of interest is taken in the use of materials on the section, there will be no need for sorting over scrap picked up on the right of way, with the thought of reusing it. If a bolt, a spike or a joint bar fails at one point, it is not suitable for reuse at any other point and can only be classed as scrap.

Should Retain Some

By L. A. Rape
Section Foreman, Baltimore & Ohio, Crothers, Pa.

There should be a scrap bin at each tool house, and scrap should be picked up daily on the work and along the track where the gang travels. It should be sorted as it is unloaded, the scrap being placed in the scrap bin and usable material in a separate corner of the bin. The foreman should be experienced enough to recognize usable material. The section forces should retain any usable material which they will need within the next 30 to 60 days, to avoid double transportation. What they cannot use within this period should be sent in, for some other section may be short of what will otherwise be lying idle.

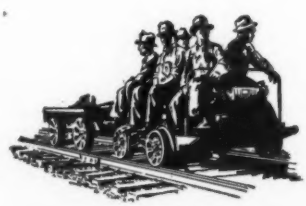
Critical Materials in Walls

How can the use of critical materials be avoided in the construction of walls and partitions? Are there advantages? Disadvantages?

Mostly Non-Critical

By A. T. Hawk
Engineer Architect, Chicago, Rock Island & Pacific, Chicago

A frame building can be constructed without using critical materials, except for the hardware. Obviously, this will include both the walls and the partitions. The same is true of buildings constructed of brick, hollow tile and concrete block. It is assumed that the frame construction will be covered on the outside with wood, cove or drop siding over sheathing and insulating felt. It is also assumed that the interior surfaces of the walls and the partitions will be finished with beaded or V-jointed ceiling, plywood, flexboard or similar material, or that the surfaces will be plastered. These are all common forms of construction for frame buildings, any of which will be satisfactory and none of which uses critical materials.



Walls and partitions of brick, concrete block or hollow tile can be left without surface treatment in some classes of buildings; in others the exterior may not be treated, but the interior may; in still others both the

exterior and interior may call for finishing. Unless unsightly second-hand brick has been used in the construction, the exterior surfaces of brick walls seldom require treatment. Concrete block designed for exterior walls is usually used without attempt at finish. Plain concrete blocks and hollow-tile exterior surfaces can be finished with stucco applied directly to the wall to give a pleasing appearance. Not infrequently the stucco is also used for the interior finish for such walls. Otherwise, by furring, interior wall surfaces of these three materials can be treated the same as the frame walls.

Steel frame construction requires the use of critical materials unless second-hand or reclaimed structural material can be employed. Reinforced concrete requires the use of reinforcing steel, a critical material, although the amount is usually relatively small. If a steel frame can be obtained by using salvaged structural shapes, it can be covered by transite, a material that is not wholly critical, and by using wood doors and windows a serviceable building can be obtained that is suitable for many purposes.

Assuming that the "work project" is or will be approved, there seems to be little need to try to secure priority for critical materials, since one can usually substitute non-critical materials and still obtain a satisfactory type of construction.

They Will Cost More

By L. C. Winkelhaus
Architectural Engineer, Chicago & North Western, Chicago

Exterior walls may be constructed of brick, load-bearing tile, concrete units or of a combination of two or all of these materials. If the inside face is to be plastered, it is essential that the walls be made impervious to water, and particularly to driving rains. Hard-burned low-absorption brick should be used for the outer face of the wall and this should be backed up with common brick or hollow tile. Tile or concrete surfaces can be finished with stucco with good results.

Windows may be of the fixed type, with ventilating panels similar to those in steel sash, except that they can be made of wood, including frames and muntins. Such windows eliminate metal sash weights, sash cords, pulleys and weight boxes. Glass blocks may be used to advantage in certain types of buildings in lieu of windows, but ventilating panels should be provided in such construction.

Lintels for window openings in clay-tile or concrete-block walls may be built from the same materials by using a few reinforcing rods and concrete. Lintels in brick walls may be timber beams with angles fastened to the beam for carrying the outer layer of brick.

If the partition walls are not load bearing, they may be of gypsum blocks or hollow tile. No particular foundation will be required for either. Any of the walls described are considered permanent construction and fireproof. They must be built by skilled labor, for which reason they will cost more than for ordinary frame construction, but they do not use critical materials.

Conserving Track Tools

What special efforts should be made to conserve track tools and thus prevent waste of critical materials?

Quality Is Important

By G. L. Sitton
Chief Engineer Maintenance of Way and Structures, Southern, Charlotte, N. C.

First of all, it is important that the tools be of good quality. On our railroad we have had a lot of experience with inferior tools. From this experience we have arrived at the very definite conclusion that tools of poor quality cost more in the long run than tools of good quality, and require much more critical material in their manufacture.

One notable example of this is scythes for cutting the right of way. Formerly, we used a very inferior grade of scythe that did not last long, but upon which we undoubtedly had to spend for the labor of sharpening each year considerably more money than the scythe itself cost. In addition, there was continual complaint from the foremen about the poor grade of the scythes. A few years ago we began to buy good scythes. Since then we have cut out a large part of the labor cost of sharpening, and we are not spending nearly as much for new scythes now as we did when we were buying poor tools.

Tools should be used for the purpose for which they were designed. Many tools have been broken or damaged by subjecting them to some use for which they were not designed.

Tools that are kept in good condition will last longer than they will if neglected. A well-kept tool is an indication of a good workman, whereas a tool that is poorly kept is direct evidence of carelessness or indifference. Lack of care in connection with track tools will generally be found hand in hand with carelessness in general.

Foremen should guard against loss of tools. They should always know just what tools they take out with them in the morning and be sure that they bring them all back in the evening.

Care should be taken to guard against breakage or other damage. While on the job, tools that may be broken should be kept out of the way of any possible damage. In loading tools on motor cars, care should be exercised to guard against breakage. Attention on the part of the foreman is required constantly to insure that tools are being given the proper care at all times. A level board broken by a jack or other heavy tool being thrown upon it is prima facie evidence of carelessness on the part of the foreman. The foreman, of course, did not intend to break the level board, but he did fail to have his men instructed and organized so that they would take care of all tools.

Seasonal tools should be protected against rust or other damage and stored where they cannot be damaged during those seasons of the year when they are not in use. Proper care to do this will insure that the tools will be in just as good condition at the beginning of the next season as they were when they were stored. While the foreman is the man who is responsible primarily for the correct use, care and handling of his tools, this is a matter that should receive close attention on the part of supervisors and roadmasters, and the men in the gang should be kept interested in taking good care of their tools.

Difficult to Obtain

By F. H. McKenney
District Engineer Maintenance of Way, Chicago, Burlington & Quincy, Omaha, Neb.

Track tools comprise one of the critical materials and are becoming increasingly difficult to obtain. It is of the utmost importance, therefore, that all of the tools now in service or to be placed in service be made to last as long as possible. It is the duty of both foremen and supervisors to see that tools are used in the proper way and that they are not abused.

Most of our safety rules stress the

proper use of tools and require prompt removal from service of any defective tools. They are sent to the stores department for repair at the reclamation plant and are reissued for further use. Spike mauls that become worn too short for use with main-line rail can be reclassified and issued for branch-line use. Through careful use and handling, the track forces can do much toward conserving them.

Shovels should not be used to pry with in place of a lining bar. Wrenches and small tools should not be used as hammers. Tools should be kept picked up and stored in the tool house or tool box when not in use. The foreman should make any small repairs that can be made in the field before the tool fails and has to be sent to the shop. Track jacks should be taken care of and the working parts should be kept out of the dirt as much as possible. The conservation of tools is largely a matter of education and supervision.

If we extend the term "track tools" to include motor cars and other power machines and power tools, such as tie tampers, mowing machines, bolt tighteners and many others, there is much that the operators of these machines can do to prolong their life. It is essential that bolts be kept tight and that all working parts are in correct adjustment. Careful attention to cleaning the air filters on motor cars and other gasoline engines will lengthen the life of the rings and bearings materially. This important task is too often neglected. Oil leaks should be watched for and oil changes should be made in accordance with instructions. Oil should be handled in such a manner as to prevent dirt getting into it or into the crank case. Here, again, supervision and education pay large dividends by keeping the machines in operation and out of the work equipment repair shop.

Training and Supervision

By Supervisor of Track

Training and supervision are the two most important elements in the management of maintenance of way work, and the more that both of these elements are applied to what many consider to be only minor details, the stronger the organization will be and the better it will function. Obviously, this does not mean the fussy attention to details that ignores other matters of importance, but the kind of training and supervision that arouses the interest of both foremen and men and instills in them respect for the instructions that must be given them from time to time.

Training in the care of tools and supervision to insure that this training is being applied has always been important; in view of the difficulties that are already being experienced in the procurement of track tools, it has now become essential. However, if it is expected that the foreman and his men will respect the tools they are using and make a real effort to conserve them, they should be of the best quality. No man can be expected to take any interest in conserving a shovel, the edge of which can be turned when used for ordinary tasks, or a lining bar that can be bent without undue effort.

On the other hand, supervision should be close enough to insure that good tools will not be abused. Any one who has examined scrap as it comes to the store house or reclamation plant has seen ample evidence that too many tools have failed primarily because they have been subjected to abuse. The shovel is probably the best example of this, for no tool undergoes so much abuse as the shovel, most of which can neither be defended nor excused.

Power Tools in Bridge Work

In what new ways can power tools be used in bridge work to offset the present shortage in labor? What tools?

Must Give More Study

By L. G. Byrd

Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

In view of the present shortage of labor, and in expectation that it is going to become still more serious, it is vitally necessary that every supervisory officer give more intensive and effective study to the various classes of work that can be carried out more speedily and more economically by the increased use of power machines and tools. This includes both bridge and building work and involves particularly those classes of work which are now being performed on many divisions, even today, by old hand methods. It is a somewhat startling fact that there are still a large number of bridge and building gangs, in fact, they will be found on practically every railway, that do not have power tools with which to do their work, or at best they are poorly equipped or underequipped. If they were provided with the power tools they should have, not only could their work be speeded up, but it could be carried out more economically.

There are still too many persons who are responsible for the work to be performed on bridges who have not yet come to appreciate the advantages inherent in power tools for these tasks. The same is true of building work. In some instances this is the result of lack of experience; in others, of indifference; while in still others, it can be traced to lack of progressiveness.

Proper and effective training is greatly needed, more today than ever before, in the operation of power tools and in moving them from one gang to another or, in case of the larger power units, from one division to another, for the purpose of keeping them in continuous operation. Power units that are lying idle represent investments that are bringing in no return; in fact, they represent an actual out-of-pocket loss in the interest that accrues continually, whether they are at work or idle. They also indicate considerable loss of interest on the part of the officer who should be responsible for keeping them in active service.

Extensive use of preframed timber in the construction and renewal of bridges has greatly reduced the amount of field work previously performed with hand tools. On the other hand, preframing has not eliminated the use of power tools in carrying on bridge work, whether it be construction or maintenance. There is still a pressing demand for power wrenches for stripping nuts and tightening bolts and for backing out and setting lag screws, also for power drills, and for chain and circular saws.

Still a Wide Field

By General Bridge Inspector

This is a subject that warrants the most serious attention on the part of both bridge and building men, for the shortage of labor that is now facing them may be expected to grow progressively worse as the war effort continues. In some places we have apparently no potential supply of skilled labor to draw on, and in others no reserve of men who might be trained to do at least some of the work required in bridge maintenance. Every indication points to the probability

that this condition will become more widespread as time goes on.

Under these circumstances, the best thing to do will be to utilize the power equipment we already have, and to get as many additional units as we can, to increase the production of the men now in our gangs and of those we may be able to hire. Power saws probably save more time than any other single tool used by carpenter gangs and, so far as practicable, every gang should have the power saws it needs. To only a slightly less extent the same is true of wood-boring tools, particularly where heavy timbers must be bored for drift bolts. In addition, power wrenches, power hoists, winches, drills and grinders, as well as suitable tools for steel gangs, for painting gangs and for concrete gangs, will not only increase the productivity of the men, but in many cases will improve the quality of their work.

None of these are new ways, however, except so far as the equipment or the practices may not have been employed by individual gangs. On the other hand, none of them are employed by all gangs, even on those roads that have the most power equipment, so that an extension of the use of the equipment mentioned should be of real benefit under the conditions that confront us. In addition to the foregoing, I have in mind the use of off-track equipment by bridge gangs, such as cranes for handling heavy timbers or steel members, and other loads; for excavating foundations, for placing heavy rip rap, and for many similar operations. This type of equipment has been used occasionally for these classes of work, but I can visualize much larger benefits than have accrued so far. Such machines do not obstruct tracks, do not require the presence of train or enginemen, and they are versatile enough so that they can be kept busy on almost any jobs that are of sufficient magnitude to warrant their assignment.

Spot or Out-of-Face?

Where difficulty is experienced in obtaining new rail, should the old rail be surfaced out-of-face or maintained by spot surfacing until it can be renewed? Why? What considerations are involved?

Reasons for Surfacing

By L. L. Adams
Engineer Maintenance of Way, Louisville & Nashville, Louisville, Ky.

Track is usually surfaced for one or all of the following reasons: (a) Because of heavy tie renewals; (b) because the ballast is muddy or otherwise fouled; and (c) because of dead track. Where these conditions exist the track should be surfaced, even though the rail is in need of renewal; otherwise, it will be impossible to maintain the track in satisfactory riding condition. It is often the case that, where the rail is badly splice-worn, corrugated or wheel-burned, it is quite difficult to maintain a satisfactory surface, but even such rail can be maintained by spot surfacing until such time as it needs out-of-face surfacing for the reasons already given.

When rail has become splice worn to such an extent that it should be renewed, especially in high-speed track, and new rail is not available, the riding quality and the maintenance condition of the rail can be improved materially by replacing the joint bars with reformed bars that have been crowned approximately 1/32 in. Again, on tangents the condition of the rail can be improved by turning it and changing the location of the joints. Special attention should be given to insure that track is in good line and surface before new rail is laid; otherwise, the new rail may be damaged badly by traffic.

Must Do More Surfacing

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

If the existing rail is in need of renewal, the assumption is that it is worn to the point where it is no longer economical to maintain it in its present location and under present traffic. In such a situation, if the rail for replacement is unobtainable,—a situation that is facing more than one engineering officer today,—then above everything, the old rail should be given a light lift—enough to make smooth and safe-riding track until the new rail is available. I doubt whether spot tamping will be satisfactory on rail that is ready for renewal, for it is likely to be center-bound and spot tamping never overcame this condition.

In this connection, it seems pertinent to note that in the future much more track should be surfaced than has been surfaced in recent years. Furthermore, more ballast must be cleaned, for without clean ballast and well-surfaced track the heavy loads and high speeds will do more damage to the rail than if the track is well maintained. As it is, our rail is wearing out faster than it has ever done before.

Any track that is scheduled for new rail should be given a light surface; all ties should be renewed and spaced; and the ballast should be cleaned. When new rail is laid on track that has been given this care, and the ties adzed carefully, the rail will have adequate and satisfactory support and will not be damaged through lack of uniform support.

Favors Spot Surfacing

By W. Woolsey
Section Foreman, Illinois Central, Chicago

Old rail that is ready for renewal presents little, if any, more improvement after out-of-face surfacing than it does after spot surfacing. To insure a good job of surfacing, the rail must have a head that is but little worn and this is something that rail that is ready for renewal never has. Again, such rail almost invariably is afflicted with either line or surface kinks, and usually both. These conditions make it practically impossible to do a good job of surfacing on the old rail, no matter how carefully the work is performed.

A stretch of track that is to be relaid with new rail should have just enough ties inserted to keep it safe, and it should be spot surfaced only enough to keep it in good riding condition. Any attempt to go beyond this will be wasted effort. When the new rail is laid, the ties should be renewed, the ballast cleaned and the track given an out-of-face raise.

Depends on Rail

By L. A. Rape
Section Foreman, Baltimore & Ohio, Crothers, Pa.

Whether rail that is ready for renewal but which cannot be replaced by reason of failure to obtain new rail, should be maintained by spot or out-of-face surfacing depends in large measure on the way the rail is worn and the condition of the joints and rail ends. If the rail ends have been built up and kept in good condition, and the fishing surfaces are not worn badly, and if the rail is not corrugated

or surface or line bent, it can be maintained to good advantage by an out-of-face surfacing.

On the other hand, if the rail ends are battered, if the rail is corrugated or surface bent, and if the fishing surfaces are worn, it will be difficult to keep it up on a new raise. Only if the ballast is foul should rail in this condition be raised out of face. Unless the ballast is fouled too badly, the best way to maintain the track until the new rail is available is by the troweling method of tamping.

What to Do About Rope

As the supply of manila fibre is now shut off and sisal fibre is frozen, what substitutes are available? How can the rope now in service be made to last longer?

Knows of No Substitutes

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Substitutes for the manila and sisal rope which were used formerly comprise a problem that will require close attention in the near future, for the rope we now have in service will reach the end of its service life before long. At present I do not know of any fibres that will take the place of these unobtainable materials. In many operations we have already discontinued the use of rope, merely because rope is unobtainable, and what we have we are saving for use where it is essential. As an example, we are using scaffold hooks of various lengths, constructed of second-hand 1⅛ and 1¼-in. rods, where we need swinging scaffolds in carrying out repairs to bridges. These hooks have a U-bend at each end, to hang over guard timbers or braces, while needle beams rest in the lower bend. This method eliminates the use of ropes and has the advantage of being safer than the rope-hung scaffold. We have also discontinued the use of rope for slings, substituting chains in their stead. This is also safer, because rope slings often become damaged when they are around square-edged timber or metal.

Conservation of the rope now on hand has become a matter of urgent importance. Oil is necessary with the use of ropes, not only to preserve them but to make them more flexible. In removing a rope from the coil, it is best done from the center, with the coil lying flat, and with the inside end next to the floor. This will tend to throw the twist out of the rope and prevent kinking. It is economical at all times to use care in the handling of ropes; it is essential now.

We are faced with definite limits with respect to the supply of rope now available. For this reason, it has become necessary to make the supply we now have on hand last as long as possible. Extreme care must be exercised in handling the ropes now on hand. Allowing a rope to get wet shortens its life, particularly if it is used while still wet. A rope swells when it becomes wet and does not return to its normal size until after it is thoroughly dry and has been worked through block sheaves, or has been put under tension in some other manner. This always results in excess wear.

If a rope is allowed to come into contact with mud or dry earth, when either wet or dry, the earth and grit will cling to it and cause undue wear when it is used. In some cases, such accumulations cannot be avoided, but the rope should be washed thoroughly and dried before it is used again. Excess wear also occurs when a rope is drawn over a rough surface, particularly when drawn around a corner, such as on square timber. This happens particularly where a round turn is taken about a member that is not round and the rope is then allowed to pay out under tension. Subjecting a rope to overstress will reduce its life appreciably, so that care should be exercised to avoid over-loading.

Care should also be taken in storing rope, whether it is used often or only occasionally. It should be kept in a dry place. If it has become damp or wet during use, it should be hung up in such a way that it will dry quickly.

Must Rely on Hemp

By Supervisor of Work Equipment

Manila hemp is a valuable cordage fibre which is used extensively in the manufacture of ropes that must possess both strength and durability. Sisal hemp is second only to manila hemp in strength and value. However, since neither of these fibres is available because the supply of manila is shut off and the sisal is frozen, it becomes necessary to look to other species of hemp, of less value as a cordage fibre. Most of the world's crop of manila hemp formerly came from Eastern Europe, although the finest quality was produced in Italy. Mexican white sisal hemp is inferior to either manila or the true sisal hemp, has a strength of about two-thirds of that of manila fibre, and is more readily affected by moisture. False sisal is a very inferior fibre produced by a species of agave that is native to Florida and Virginia.

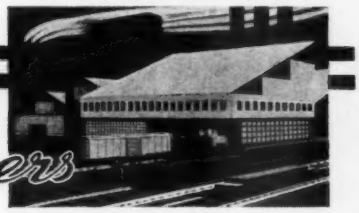
Other forms of hemp which may be used in the manufacture of rope are grown in the United States, Kentucky, Ohio and Wisconsin being the largest producers. The department of agriculture is now endeavoring to encourage production, as it is upon this source that we must rely for our rope fibre until world production again becomes normal. Cotton fibre is used for the manufacture of smaller ropes, such as bell cords, sash cords, clothes lines, etc., but is not adapted for ropes for industrial use.

In view of the shortage of suitable fibre for making rope, it is imperative that the rope now on hand and that in use be given the best of care in handling, to prolong its life. Rope carried in outfit cars is frequently neglected and abused. It is only fair to say, however, that this can usually be traced to lack of knowledge rather than to carelessness or wilful neglect. The average employee, even among those of experience, does not always realize that a rope may be damaged seriously by merely dragging it along the ground. This not only wears the rope but causes it to pick up dirt and grit which become embedded and weaken it by cutting and wearing the fibres. Obviously, it is difficult to avoid dragging a rope occasionally, but it should be avoided so far as practical.

Bending a rope over a sheave of small diameter may reduce the strength and shorten its life. Using it under load in a sheave having a narrow groove will wear and break the fibres, while bending the rope around sharp corners will have the same effect. Rope under heavy tension may be quickly damaged to the breaking point by even slight abrasion, such as may be caused by rubbing it against another rope or a rough surface.

Rope should always be dried before it is stored away, since wet rope rots quickly, particularly if stored in an unventilated place. However, it should not be stored close to steam pipes or radiators. It should not be allowed in contact with acids, paints or oils. Large ropes should be coiled on planks or gratings raised slightly above the floor. If left out at night or at other times when not in use, rope should be covered to protect it from the weather.

PRODUCTS of Manufacturers



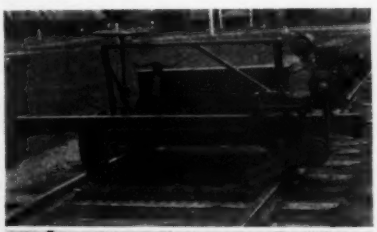
Improvements In Fairmont Mowers

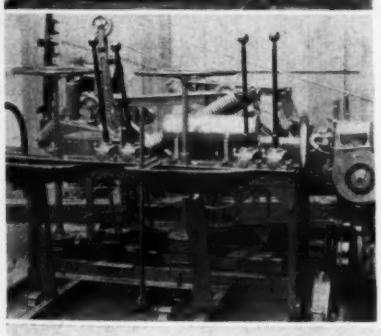
FAIRMONT Railway Motors, Inc., Fairmont, Minn., has made a number of improvements in its Fairmont-Rawls M5 mower, the M24 series E mower and the single-swath weed mower, which are said to result in better operation and reduced maintenance.

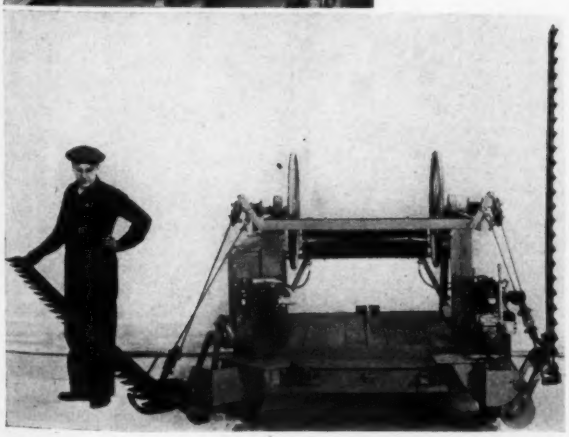
The M5 model Fairmont-Rawls mower is now equipped with the Fairmont differential axle and two tight insulated wheels for the front axle. In addition to eliminating the loose wheel and making both front wheels the same, the new construction offers better handling on or off the track because the front wheels turn independently of each other and reduces the number of surplus parts that must be kept in stock for protective service. Heavy-duty sickle sections are now standard equipment with the M5. These sections have a longer life and give better performance, particularly in heavy mowing.

The M24 series E now has a simplified hydraulic system of controls which includes the use of a single oil reservoir tank, a filter, separate pumps for each ram and foot-pedal-type releases for the oil lines. The new set-up allows the operator to retain his hold on the controls and eliminates shifting or using more than one lever with one hand. The cutter bar angle and also the position of the inner shoe are varied by manipulation of the hydraulic controls. To raise either the cutter bar or the inner shoe, the workman operates the pump connected to the ram, giving the desired motion. Lowering is accomplished by depressing a foot pedal, allowing oil to return to the reservoir. One pump and one pedal control each ram. With this method of operation, it is said that the operator can follow accurately the contour of the shoulder.

On the single-swath weed mower, now designated as the class W54, series D, multiple V-belts are used to drive the pitman crank wheel, and the power head forms its own oil reservoir for lubrication of the two pitman wheel shaft Timken bearings. The pitman is the same heavy-duty type, made of spring steel, used on the larger Fairmont mowers. Reduced vibration and better support have been brought about by strengthening the engine base and improving the clamp, and the unit is equipped with heavy-duty sickle sections which are said to give better service in unusually heavy weeds or light brush. Refinements have been made to the frame and a full-length toolbox is located at the rear of the unit. The single-swath weed mower will mow between the rails or on the shoulder to a distance of nine ft. from the center of track. Any section motor car can tow the machine.







Top Above — the Improved Single-Swath Mower. Center Above — The New Controls of the M24, Series E Mower. Left — The M5 Model Fairmont-Rawls Mower

New Eye-Protection Glass for Welders

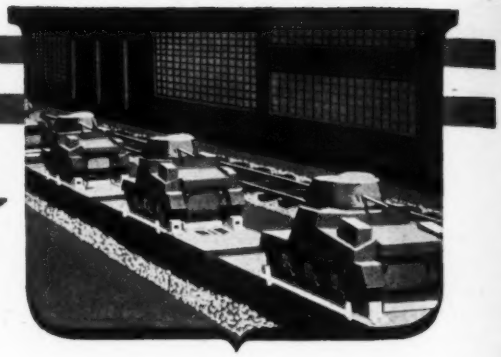
A NEW type of glass, named Didymium-Noviweld, has been developed by the American Optical Company, Southbridge, Mass., for the eye-protection of those engaged in welding. The new product is said to permit welders to pierce glare and watch the welding operation from beginning to end, and in that manner to speed up welding operations.

A Welder Wearing Goggles Equipped with the New Didymium-Noviweld Lenses

Lenses made of the new glass, it is said, possess the ray-absorptive properties of the company's Noviweld glass, plus the special characteristics of Didymium, a combination of elements with high absorption in that particular portion of the visible spectrum where "flux glare" normally obstructs clear vision. The glass also cuts down the high intensity of sodium rays of the fluxes and protects the eye by absorbing the invisible, yet tiring, ultra-violet and infra-red rays generated during welding.

Didymium-Noviweld lenses are manufactured to meet the Bureau of Standards' specifications for glare control and are available in three shades: Nos. 4, 5 and 6.

NEWS of the Month



Troop Movements Three Times Those of 1942

American railroads carried more than three times as many troops in organized movements in the first two months of 1943 as they did in the corresponding period of 1942, according to a statement made at a recent meeting in San Francisco by M. J. Gormley, executive assistant of the Association of American Railroads. At the present time, Mr. Gormley declared, approximately 1,750,000 men travel monthly on the railroads in organized parties.

February Railroad Employment Up 12.4 Per Cent

Although railroad employment showed a decrease of 0.45 per cent (from 1,319,114 to 1,313,145) during the one-month period from mid-January to mid-February, the total for the latter month was 12.4 per cent above the comparable 1942 figure. This was shown by preliminary reports prepared by the Interstate Commerce Commission's Bureau of Transport Economics and Statistics. The largest employment increase was in the maintenance of way and structures group, up 24.74 per cent.

No 1942 Reduction in Fatal Crossing Accidents

Although curtailed use of automobiles brought about a 30 per cent reduction in motor vehicle fatalities in 1942, the number of persons killed in grade crossing accidents was greater than in 1941, according to a statement issued recently by Director Joseph B. Eastman of the Office of Defense Transportation.

Mr. Eastman, who spoke on behalf of the National Safety Council's campaign to "Save Manpower for Warpower," declared that, although final reports are not yet available, it is estimated that nearly 2,000 persons were killed and over 4,600 injured in grade crossing accidents. In addition to causing a high mortality rate, this type of accident, Mr. Eastman pointed out, often causes destruction or damage of railroad material and equipment now largely irreplacable, and causes train delays.

WPB Issues Limiting Order on Rail and Fastenings

Under order L-211, Schedule 7, dated February 25, the War Production Board has issued an order requiring that "no person shall produce, fabricate, deliver or accept rail or track accessories which he knows or has reason to believe do not conform to a specification set forth in List 1 of this schedule." List 1 includes the AREA emergency specifications issued in 1942 covering open-hearth rails; AREA specifications issued in 1936 covering quenched carbon-steel joint bars; AREA emergency specifications covering heat-treated carbon-steel bolts and nuts; AREA emergency specifications for track spikes of soft steel and of high carbon steel; and AREA emergency specifications for both soft and medium grade, and high-carbon tie plates (reported in the September issue). This order applies to all rail and fastenings manufactured after the date of issue.

E. H. Fritch, Retired A. R. E. A. Secretary, Dies

E. H. Fritch, secretary of the American Railway Engineering Association from 1906 until his retirement on May 1, 1937, died at South Bend, Ind., on March 18. Mr. Fritch was born at Galena, Ill., on March 13, 1860, and in his early years worked as a "printer's devil" at Springfield, Ill., and later as a printer for the Curtis Publishing Company, Philadelphia, Pa. He

E. H. Fritch

entered railway service in April, 1896, in the traffic department of the Baltimore & Ohio Southwestern (now part of the B. & O.) at Washington, Ind., and in July, 1897, was transferred to the office of the division engineer. In February, 1900, shortly after the organization of the American Railway Engineering and Maintenance of Way Association (now the A.R.E.A.) he became assistant secretary, with headquarters at Chicago, and in March, 1906, he was elected secretary, which position he held until his retirement. In this capacity, Mr. Fritch wielded a strong influence on this association, especially during its formative years, and the high standards of its committee and other activities, and of its proceedings, are due in large measure to his insistence upon thoroughness.

Draft Boards Advised Transportation an Essential Activity

"Maintenance of all facilities and production of items needed for the transportation of essential items" is one of the primary categories of essential activities indexed by the War Manpower Commission for the use of U. S. employment offices and selective service boards in considering occupational deferment of men liable for military service, the WMC indicated in a March 25 announcement.

Military Freight About Four Times Peak of World War I

According to the Transportation Corps, the American railways handled 41,000,000 tons of army freight during the first 12 months of the war, as compared to 11,224,427 tons handled in the period from July, 1918, to June, 1919, which included the peak months of freight movement in World War I. The heaviest monthly movement of the last war was 1,445,535 tons, while the largest monthly movement during the first year of the present war was 5,600,000 tons of freight.

McCarthy Sees Car Shortage This Year

That the car supply is not "comfortable" and car movement is not "assuring," was the statement of Henry F. McCarthy, director of the Division of Traffic Movement of the Office of Defense Transportation, at a meeting of the New England Shippers Advisory Board, held on March 18 at Boston, Mass.

The time required for transit of railroad freight shipments has increased as much as 50 per cent in some cases, Mr. McCarthy declared, and added that the additional time required for turn-around of freight cars has had the effect of 4.2 per cent decrease in box car supply and a 6.8 per cent decrease in the open-top car supply, as compared to last year. The speaker said that gains in the net car supply from heavier loading and other conservation measures have been offset by this development and further steps, voluntary or directed, will be necessary for the railroads to "make the grade during the remainder of the war months."

Personal Mention

General

G. R. Haworth, general manager of the Western Maryland, and an engineer by training and experience, has been elected vice-president of that road, with headquarters as before at Baltimore, Md.

John W. Purdy, assistant superintendent of the Akron-Chicago division of the Baltimore & Ohio, and engineer by training and experience, has been promoted to superintendent of the Indianapolis division.

J. J. Van Bockern, roadmaster on the Chicago, Milwaukee, St. Paul & Pacific at Savanna, Ill., has been promoted to trainmaster at that point.

C. K. Carter, Jr., trainmaster on the Southern at Greensboro, N.C., and a maintenance officer by training and experience, has been promoted to superintendent of the Georgia Southern & Florida, with headquarters at Macon, Ga.

Frank D. Beale, assistant vice-president and assistant to the president of the Chesapeake & Ohio, the Pere Marquette and the New York, Chicago & St. Louis (Nickel Plate), and an engineer by training and experience, has been elected vice-president in charge of operations of the Nickel Plate, with headquarters as before at Cleveland, Ohio. Mr. Beale was born at Fredericksburg, Va., on November 4, 1890, and graduated from the University of Virginia in 1915. He entered railway service in 1910 as a rodman on the Florida Railway (now abandoned) and subsequently served as instrumentman and assistant engineer. In October, 1915, Mr. Beale became an assistant section foreman on the Chesapeake & Ohio, and in August, 1916, he was promoted to assistant supervisor of track of the Rivanna district, being advanced to division engineer

Frank D. Beale

of the Clifton Forge division six months later. He served in the U. S. Army from 1917 to 1919 and in the later year returned to the C. & O. as division engineer of the Clifton Forge division. In 1924 Mr. Beale was appointed trainmaster of the Richmond division, later being advanced successively to superintendent of that division, and to assistant general superintendent. In 1940 he was elected assistant vice-president and assistant to the president of the C. & O., the Nickel Plate and the Pere Marquette.

Armstrong Chinn, chief engineer of the Alton, has been promoted to general manager, with headquarters as before at Chicago. Mr. Chinn was born at Dallas, Tex., on September 26, 1894, and graduated from Virginia Polytechnic Institute in 1916. He entered railway service in the latter year as an instrumentman on the Chicago, Burlington & Quincy at Aurora, Ill. During 1918 and 1919 he served as a second lieutenant of field artillery in the American Expeditionary Force in France and then returned to the Burlington, where he was engaged from 1919 to 1921 as an instrumentman on yard construction at La Crosse, Wis., and Centralia, Ill. In 1922, he was promoted to assistant engineer at Aurora, where he remained until 1923 when he became division engineer and roadmaster of the Quincy, Omaha & Kansas City (controlled

Armstrong Chinn

by the C. B. & Q.), at Kansas City, Mo. Mr. Chinn was transferred back to the Burlington as roadmaster at Kansas City in 1925 and in the following year he was promoted to assistant engineer maintenance of way at Alliance, Neb. Early in 1927 he was promoted to district engineer maintenance of the Wyoming district, with headquarters at the same point, and later in the year he was transferred to Lincoln, Neb., and also placed in charge of work equipment. On December 1, 1929, Mr. Chinn was appointed chief engineer of the Alton, with headquarters at Chicago. Mr. Chinn is a past-president of the American Railway Bridge & Building Association and of the Roadmasters' and Maintenance of Way Association of America. At present he is a member of the Board of Direction of the American Railway Engineering Association.

Charles J. Geyer, engineer maintenance of way of the Chesapeake & Ohio, has been promoted to general manager, with headquarters as before at Richmond, Va. Mr. Geyer was born at Zanesville, Ohio, on April 6, 1889, and entered railway service in April, 1908, as a rodman on the C. & O. at Huntington, W. Va. In 1910 he was appointed instrumentman at Cincinnati, Ohio, and in May, 1914, he was advanced to assistant engineer, maintenance of way department, system. Four years later Mr. Geyer was promoted to division engineer, with headquarters at

Charles J. Geyer

Richmond, becoming assistant superintendent, maintenance of way, in 1924. From 1929 to 1934 he served as assistant to the vice-president and on April 2, 1934, he was appointed engineer, maintenance of way, with the same headquarters, the position he held until his new appointment, effective March 15.

Engineering

C. K. Hoffmeister has been appointed assistant engineer, water supply, of the Texas & Pacific, with headquarters at Dallas, Tex.

Herbert Fisher has been appointed assistant division engineer on the Southern Pacific Lines in Texas and Louisiana at Austin, Tex., succeeding **P. M. Williams,** who retired on March 1.

Royden R. Brockway, assistant bridge engineer of the Northern Pacific, has been promoted to bridge engineer, with headquarters as before at St. Paul, Minn., succeeding **M. W. Beach** who has retired.

B. J. Hogan, assistant engineer on the staff of the chief engineer of the Southern Pacific, has been appointed assistant division engineer of the Coast division, with headquarters at San Francisco, Cal., succeeding **Harold S. Kellam,** whose death was reported in the March issue.

John C. Jacobs, supervisor of track on the Illinois Central at East St. Louis, Ill., has been promoted to division engineer at Water Valley, Miss., succeeding **Paul H. Croft,** who has been transferred to the Chicago Terminal division at Chicago, replacing **R. H. Carter,** whose promotion to assistant terminal manager of the Chicago terminal, was reported in the March issue.

E. R. Logie, engineer of the Southern Ontario district of the Canadian National, has been appointed acting engineer maintenance of way of the Central region, with headquarters as before at Toronto, Ont., to take the place of **L. Brusseau,** who is absent due to illness. **H. E. Smith** has

been appointed acting district engineer at Toronto to succeed Mr. Logie.

William T. Covert, assistant chief engineer of the Pennsylvania system, with headquarters at Philadelphia, Pa., has retired from active service.

J. D. Moffat, assistant to the chief engineer of the Western region of the Pennsylvania, has been promoted to chief engineer of the Western region, with headquarters as before at Chicago, succeeding **Isaac W. Geer,** who retired on March 31. **G. W. Patterson,** assistant engineer at Chicago, has been advanced to assistant to the chief engineer of the Western region, replacing Mr. Moffat.

L. T. Nuckols, assistant chief engineer of the Chesapeake & Ohio, has been promoted to engineer maintenance of way, effective March 16, with headquarters as before at Richmond, Va., to succeed **Charles J. Geyer,** whose promotion to general manager is noted elsewhere in these columns. **Crosby Miller,** bridge engineer, has been promoted to assistant chief engineer to succeed Mr. Nuckols, and **C. H. Chapin,** designing engineer in the office of the bridge engineer, has been promoted to bridge engineer to replace Mr. Miller.

Walter R. Parvin, whose appointment as chief engineer, maintenance of way of the Eastern region of the Pennsylvania, with headquarters at Philadelphia, Pa., was reported in the March issue, was born on March 15, 1892, at Wilkinsburg, Pa. Mr. Parvin graduated in civil engineering from the University of Pittsburgh

Walter R. Parvin

in 1915 and entered the service of the Pennsylvania as a chainman on June 15, 1912. He served in the first World War, and upon his return to the employ of the Pennsylvania, he was appointed assistant supervisor of track, and subsequently became supervisor of track at Jersey City, N.J. Mr. Parvin served as division engineer at Cape Charles, Va., and at Chicago, and was engineer maintenance of way, on the Southwestern division, at Indianapolis, Ind., prior to his recent promotion.

B. R. Kulp, chief engineer of the Chicago & North Western, has also been appointed chief engineer of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters as before at Chicago, and **Ralph R. Strother,** chief engineer of the Omaha, has been appointed assistant chief engineer of the North Western and the Omaha, with headquarters at Chicago. **Frank C. Huffman,** assistant chief engineer of the North Western and **John A. Lorch,** assistant to the chief engineer of the North Western at Chicago, both retired on March 31. **L. R. Lamport,** division engineer of the Galena division of the North Western, has been promoted to assistant to the chief engineer of the North Western and the Omaha, with headquarters as before at Chicago. **E. C. Vandenburgh,** engineer of maintenance of the North Western, has been appointed also engineer of maintenance of the Omaha, and **F. W. Hillman** and **C. E. Miller,** assistant engineers of maintenance of the North Western, have been appointed also assistant engineers of maintenance of the Omaha, with headquarters as before at Chicago. **A. E. Bechtelheimer,** engineer of bridges, and **A. R. Harris,** assistant engineer of bridges, have been appointed also the same positions on the Omaha. **John G. Bock,** assistant chief engineer of the Omaha, has been appointed division engineer of the Eastern division of that road, with headquarters as before at St. Paul, Minn., and **H. W. Jensen,** assistant engineer of the Omaha at St. Paul, has been appointed division engineer of the Western division of that road, with headquarters at St. Paul.

Peter V. Thelander, division engineer of the Peninsula division of the North Western at Escanaba, Mich., has been transferred to the Galena division at Chicago, succeeding Mr. Lamport. **F. W. Creedle,** division engineer of the Sioux City district of the Iowa and Northern Iowa divisions, at Sioux City, Iowa, has been transferred to the Peninsula division, replacing Mr. Thelander, and **A. E. Benson,** assistant engineer, Galena division, has been promoted to division engineer at Sioux City, relieving Mr. Creedle. The above appointments were all effective April 1.

Morris D. Carothers, division engineer of the Eastern division of the Alton, with headquarters at Bloomington, Ill., has been promoted to chief engineer, with headquarters at Chicago, succeeding **Armstrong Chinn,** whose promotion to general manager is reported elsewhere in this issue. **Earl M. Unzicker,** assistant division engineer of the Eastern division of the Alton, has been promoted to division engineer of that division, replacing Mr. Carothers and **Fred E. Wall,** acting assistant division engineer of the Western division, has been promoted to assistant division engineer of the Eastern division, with headquarters as before at Bloomington, relieving Mr. Unzicker. **W. H. Stumm,** instrumentman on the Eastern division, has been advanced to acting assistant division engineer of the Western division, succeeding Mr. Wall.

Mr. Carothers was born at Cutler, Ohio, on April 24, 1886, and attended Marietta college, Marietta, Ohio. He entered railway service on June 1, 1908, as a rodman on the Erie at Washingtonville, N.Y., later serving as an inspector on the Hudson tunnel at New York. On May 1, 1909, he went with the Baltimore & Ohio as an assistant track foreman at Philadelphia, Pa., and two months later he was promoted to extra gang foreman, serving in that capacity on the Philadelphia and Cumberland divisions. From June 1, 1910, to October 1, 1912, he served as instrumentman in charge of an engineering party and engineer in charge of a survey on the Cumberland and Pittsburgh divisions, being appointed assistant supervisor of track on the latter date. Mr. Carothers was advanced to supervisor of track on the Illinois division on February

Morris D. Carothers

15, 1913, and was later transferred to the Ohio division. On November 1, 1917, he was promoted to assistant division engineer of the Toledo division and on July 1, 1919, he was appointed maintenance assistant of the Baltimore & Ohio Chicago Terminal, with headquarters at Chicago. On February 15, 1937, he went with the Alton as division engineer of the Eastern division, with headquarters at Bloomington, which position he held until his recent promotion, effective March 16.

John L. Beckel, assistant engineer in the office of the engineer of structures of the New York Central, Lines Buffalo and East, has been promoted to engineer of bridges in the maintenance of way department of the Lines Buffalo and East, with

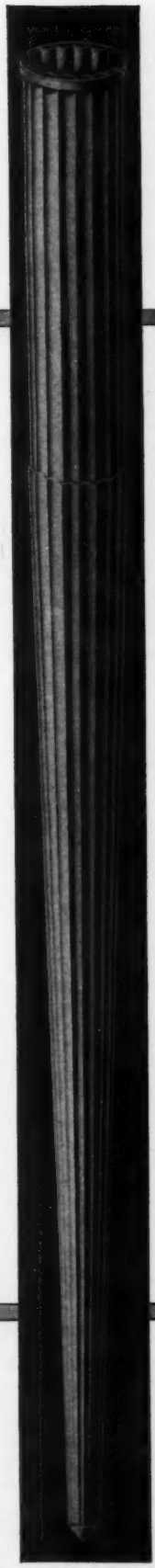
John L. Beckel

headquarters as before at New York, to succeed **Allan W. Carpenter,** who has retired, effective March 1.

Mr. Beckel was born on September 30, 1903, at Brooklyn, N.Y., and graduated in civil engineering from Brooklyn Poly-

(Continued on page 310)

MONOTUBES



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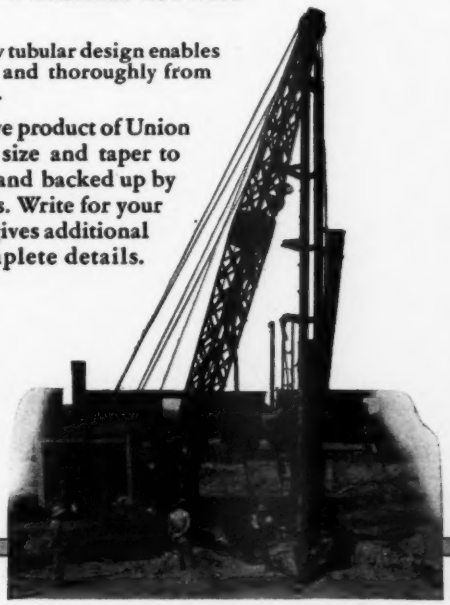

THE UNION METAL MANUFACTURING COMPANY

CANTON, OHIO

technic Institute in 1925. In that year he entered the service of the Brooklyn-Manhattan Transit Company as a designer in the office of the chief engineer. In 1929, Mr. Beckel went with the New York Central as assistant engineer in the office of the engineer of structures at New York, which position he held until his recent promotion to engineer of bridges.

Mr. Carpenter was born on February 28, 1873, at Port Henry, N.Y., and attended the University of Wisconsin and the Case School of Applied Science. During summer vacations while attending

Allan W. Carpenter

college, Mr. Carpenter held minor engineering positions with various railroads and a private engineering concern. In 1895 he joined the Osborn Company, civil engineers of Cleveland, Ohio, where he remained for five years. At the end of this period he entered the service of the New York Central as an assistant engineer. In 1902, he was appointed division supervisor of bridges and buildings, and in the following year he was advanced to division engineer. From 1904 to 1913, he served as engineer of bridges and engineer of structures, then being appointed assistant valuation engineer. In 1932, Mr. Carpenter was appointed engineer of bridges in the maintenance of way department of the Lines Buffalo and East, the position he held until his retirement.

Track

W. O. Ritchey, section foreman on the Nashville, Chattanooga & St. Louis, has been promoted to track supervisor on the Atlanta division.

J. L. Alter, track supervisor of the Atchison, Topeka & Santa Fe between Victorville, Cal., and Barstow, has been promoted to assistant roadmaster, with headquarters at Victorville.

M. C. Day, assistant roadmaster on the Union Pacific at Omaha, Neb., has been promoted to roadmaster at Columbus, Neb. **M. Foreman** has been appointed roadmaster at Grand Island, Neb., and **L. T. Anderson,** roadmaster at Gering, Neb.

William Ringlbauer, general foreman on the Chicago, Milwaukee, St. Paul & Pacific, has been promoted to roadmaster at Savanna, Ill., succeeding **J. J. Van Bockern,** whose promotion to trainmaster is reported elsewhere in these columns.

P. T. Wynne, extra gang foreman on the Nashville, Chattanooga & St. Louis, has been promoted to track supervisor on the Chattanooga division.

R. E. Miller, general foreman on the Logansport division of the Pennsylvania, has been promoted to assistant supervisor, Chicago Terminal division, with headquarters at Colehour, Ill., succeeding **A. E. Myles,** who has been transferred to the Panhandle division at Coshocton, Ohio.

Thomas L. Robinson, roadmaster of the Atlantic & East Carolina at Kinston, N.C., has been appointed general supervisor in full charge of the maintenance of way department of that road, with headquarters at New Bern, N.C.

J. M. Collins, supervisor of track on the Columbus division of the Pennsylvania at Columbus, Ohio, has been transferred to the Eastern division at Canton, Ohio, succeeding **P. C. Smedley,** who has been transferred to the Ft. Wayne division at Ft. Wayne, replacing **H. Hill,** who has been transferred to the Grand Rapids division at Cadillac, Mich. Mr. Hill relieves **J. L. Tedesco,** who, in turn, has been transferred to the Columbus division succeeding Mr. Collins.

William R. Willhoite, assistant roadmaster on the Chicago, Rock Island & Pacific in charge of the removal of the Seymour line (in Texas), has been promoted to roadmaster at Chickasha, Okla., succeeding **D. Sullivan,** who has been transferred to Dalhart, Tex., relieving **John Burns.** Mr. Burns has been transferred to Trenton, Mo., replacing **S. P. Jones,** who has been transferred to Pratt, Kan., replacing **R. B. Smith,** promoted to the operating department.

Louis M. Berger, whose promotion to roadmaster on the Missouri-Kansas-Texas, with headquarters at Waco, Tex., was reported in the February issue, was born at Stronghurst, Ill., on February 11, 1891, and entered railway service on August 17, 1908, as a section laborer on the Katy. In 1911 he was advanced to section foreman and in 1928 he was promoted to construction foreman, which position he held until his recent promotion, effective January 1.

Edward R. Leonard, whose promotion to roadmaster on the Southern Pacific, with headquarters at Gila Bend, Ariz., was reported in the January issue, was born at Salmer, Tenn., on December 6, 1909, and entered railway service on June 10, 1935, as a section laborer on the Southern Pacific, at Yuma, Ariz. He was promoted to relief foreman on January 7, 1936, and advanced to section foreman on March 22, 1937. Mr. Leonard was appointed extra gang foreman on the Tucson division in 1941 and on July 1, 1942, he was promoted to general foreman at Tucson, Ariz., which position he held until his recent promotion.

E. R. Word, supervisor of track on the Illinois Central at Waterloo, Iowa, has been transferred to East St. Louis, Ill., succeeding **John C. Jacobs,** whose promotion to division engineer at Water Valley, Miss., is reported elsewhere in these columns. **F. L. Stiner,** supervisor of track at Cherokee, Iowa, has been transferred to Waterloo, succeeding Mr. Word, and **John S. Foley,** supervisor of track at Waterloo, replaces Mr. Stiner at Cherokee. **John Brosnahan,** general foreman on the Illinois division, succeeds Mr. Foley as supervisor of track at Waterloo. **J. A. Harrington,** rodman at Waterloo, Iowa, has been appointed to the newly-created position of assistant supervisor of the Iowa division, lines West of the West switch at Waterloo, with the same headquarters.

Ollie L. Parker, whose promotion to roadmaster on the Southern Pacific, with headquarters at Merced, Cal., was reported in the January issue, was born at Big Spring, Tex., on June 4, 1896, and entered railway service in 1911 as a section laborer on the El Paso & Southwestern (now part of the Southern Pacific). From 1914 to July, 1918, he served as assistant foreman and section foreman and on the latter date he enlisted in the U. S. Navy. He returned to the Southern Pacific in December, 1919, and served as extra gang and section foreman until 1926, when he resigned to enter other employment. Mr. Parker returned to railroad service in January, 1928, with the Trona railway, serving as roadmaster and conductor combined until June 7, 1937, when he returned to the Southern Pacific as extra gang foreman. In 1938 he was advanced to general foreman and in 1939 this position was abolished and he then served as extra gang and section foreman until his recent promotion.

Bridge and Building

H. F. Bird, assistant supervisor of bridges and buildings of the Syracuse division of the New York Central, with headquarters at Syracuse, N.Y., has been promoted to supervisor of bridges and buildings of that division, with the same headquarters, succeeding the late **E. L. Jenkins,** whose death on February 10 was noted in the March issue. **G. W. Lee,** bridge and building inspector, with headquarters at Rochester, N.Y., has been promoted to assistant supervisor of bridges and buildings at Syracuse.

Obituary

L. B. Edmonson, who retired in 1942 as track supervisor on the Illinois Central, with headquarters at Vicksburg, Miss., died recently in a hospital at Gulfport, Miss.

Luther W. Craus, supervisor of water service of the Chicago, Rock Island & Pacific system with headquarters at Des Moines, Iowa, whose death on January 12 was reported in the February issue, was born at Irving, Ill., on June 21, 1883, and entered railway service on the Rock Island on March 1, 1911, as an inspector of gasoline engines at Davenport, Iowa. On February 1, 1913, he was appointed water service inspector, with headquarters at Des Moines. In 1932 Mr. Craus was promoted to supervisor of water service for the system, with headquarters at Kansas City, Mo., later transferring his headquarters to Des Moines.

(Continued on page 312)

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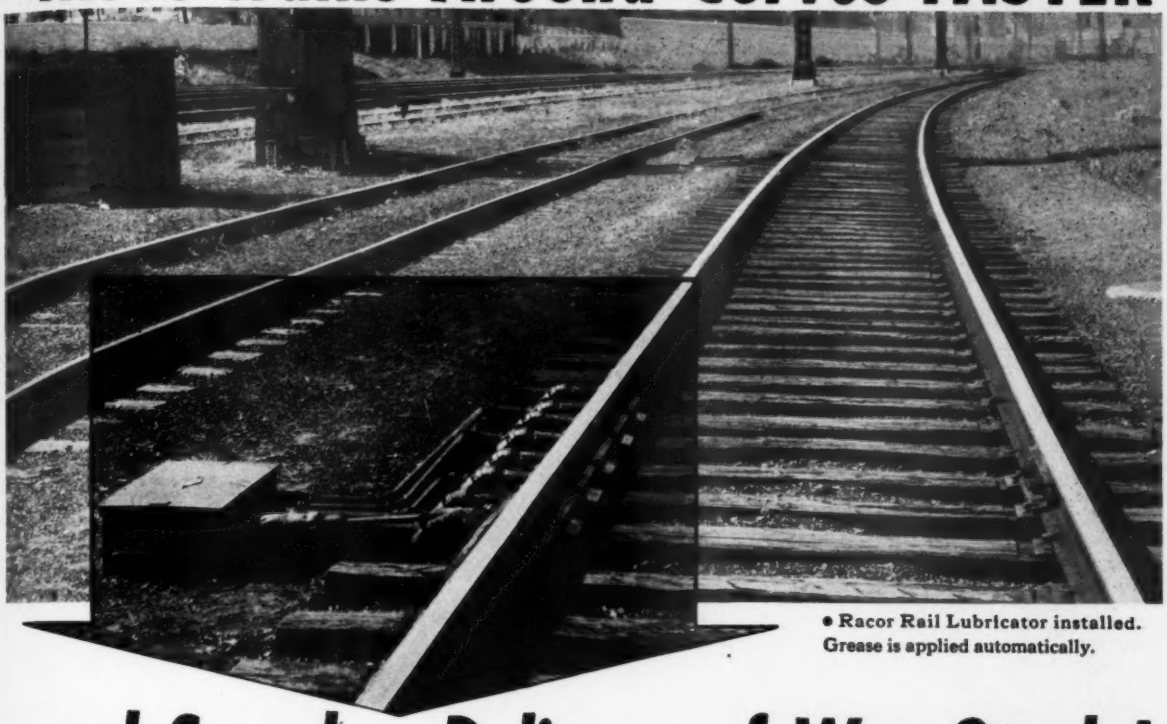

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Association News

Railway Tie Association

The Association will hold its twenty-fifth annual meeting at the Hotel Statler, St. Louis, Mo., on May 4, this decision having been reached by the Executive committee at a recent meeting in New Orleans, La. The meeting will be a one-day wartime conference to consider the problems confronting the producers and users of crossties. This meeting will celebrate the completion of a quarter century's activities and will be held in the hotel in which the Association was organized on January 31, 1919.

Maintenance of Way Club of Chicago

Ninety-three members and guests attended a meeting on the evening of March 22, which was addressed by W. D. Beck, district manager, Car Service Division, A. A. R., who spoke on Cars—The No. 1 Problem of the Railways. Laying particular emphasis upon what maintenance of way men can do to help in the solution of this problem, Mr. Beck called for the prompt loading and unloading of company materials, urged avoidance of the use of first-class cars in company services, except in emergencies, and asked that minimum use be made of flat cars and gondolas.

The next meeting of the club, its Annual meeting with election of officers, will be held on April 26.

Wood-Preservers' Association

The one-day "war-time" annual meeting, which will be held at the Palmer House, Chicago, on April 27, will be confined to the receipt of reports of committees and essential items of general business, including the installation of new officers. A proposal will also be submitted to change the annual meeting from January to April and to change the fiscal year to commence on April 1 instead of on January 1 as heretofore.

Reports will be presented by committees on Preservatives; Coordination and Standardization of Treatment Specifications; Pressure Treatment of Oak Ties and Lumber; Douglas Fir—Pressure Treatment; Pressure Treatment of Southern Pine Ties and Lumber; Pressure Treatment of Southern Pine Piles; Pressure Treatment of Poles; Non-Pressure Treatment of Poles; Inspection; Painting of Creosoted Wood; Tie Service Records; Bridge and Structural Timber; Service Bureau Board; Marine Piling Service Records; Pole Service Records; International Termite Exposure Test; Post Service Records; Diversified Uses of Treated Wood; Uses of Treated Wood for Car Lumber; and Fireproofing.

Bridge and Building Association

The following committees have been appointed and are now actively at work on the preparation of reports to be presented at the next meeting of the Association:

No. 1—Salvaging Bridge, Building and Water Service Materials—H. W. Wuerth (chairman), div. engr., C. M. St. Pt. & P., Savanna, Ill.; E. H. Barnhart (vice-chairman), div. engr., B & O., Garrett, Ind.; W. A. Huckstep (vice-chairman), gen. br. supvr., M. P., St. Louis, Mo.; Maxfield Bear (vice-chairman), est., C. & N. W., Chicago; John E. Bird, b. & b. insp., N. Y. C., Corning, N. Y.; R. W. Cook, gen. br. insp., Seaboard, Norfolk, Va.; J. B. Lodeski, asst. gen. br. insp., C. & N. W., Chicago; G. L. Sitton, ch. engr., m. w. & str., Sou., Charlotte, N. C.; M. P. Walden, asst. supvr. b. & b., L. & N., Evansville, Ind.; L. G. Byrd, supvr. b. & b., M. P., Poplar Bluff, Mo.; R. H. Morrison, supt. b. & b., Bang. & Aroos, Houlton, Me.; and Alfred G. Rose, sc. & br. insp., M. P., Osawatomie, Kan.

No. 2—Men—How to Secure and Hold—M. D. Carothers (chairman), chi. engr., Alton, Chicago; E. E. Tanner (vice-chairman), gen. supvr. b. & b., N. Y. C., New York; N. D. Howard (vice-chairman), managing editor, *Railway Engineering and Maintenance*, Chicago; H. C. Crawford (vice-chairman), b. & b. supvr., S. P., Dunsmuir, Cal.; Abraham Frazin, engr. dftsman, C. & N. W., Chicago; G. H. Holmes, supvr. b. & b., M. P., Falls City, Neb.; A. M. Knowles, engr. str., Erie, Cleveland, Ohio; P. L. Koehler, div. engr., C. & O., Ashland, Ky.; M. Meyer, supvr. b. & b., C. & W. I., Chicago; and Dee Worlow, b. & b. fore., M. P., Kansas City, Mo.

No. 3 — Materials — Possibilities of Relief Through Substitutes—W. A. Sweet (chairman), gen. fore. b. & b., A. T. & S. F., Newton, Kan.; H. M. Church (vice-chairman), gen. supvr. b. & b., C. & O., Richmond, Va.; W. L. Anderson (vice-chairman), off. engr., C. & N. W., Chicago; L. E. Peyser (vice-chairman), asst. arch., S. P., San Francisco, Cal.; F. W. Dayton, arch. dftsman, C. & N. W., Chicago; H. M. Dick, mast. carp., Penna., Toledo, Ohio; A. G. Dorland, asst. engr., E. J. & E., Joliet, Ill.; A. W. Glander, ch. carp., C. M. St. P. & P., Mason City, Ia.; F. W. Hutcheson, asst. supvr., b. & b., C. & O., Newport News, Va.; F. H. Masters, ch. engr., E. J. & E., Joliet, Ill.; and B. M. Whitehouse, gen. br. insp., C. & N. W., Chicago.

No. 4—The Maintenance of Coaling and Sanding Plants to Meet Today's Exacting Requirements—A. L. McCloy (chairman), supvr. b. & b., P. M., Saginaw, Mich.; B. F. Francis (vice-chairman), supvr. b. & b., N. Y. C., Jersey Shore, Pa.; P. L. Koehler (vice-chairman), div. engr., C. & O., Ashland, Ky.; F. R. Spofford (vice-chairman), b. & b. supvr., B. & M., Boston, Mass.; L. Clapper, asst. ch. engr., D. M. & I., Duluth, Minn.; D. W. Converse, asst. engr., A. C. & Y., Akron, Ohio; L. A. Cowsert, w. insp., B. & O., Dayton, Ohio; V. E. Engman, ch. carp., C. M. St. P. & P., Savanna, Ill.; W. K. Manning, gen. fore., Erie, Cleveland, Ohio; L. R. Thompson, supvr. b. & b., M. & St. L., Oskaloosa, Ia.; H. D. Tubbs, res. engr., P. & M., Detroit, Mich.; H. A. Wistrich, asst. ch. engr., L. V., Bethlehem, Pa.; and J. F. Zanolio, mast. carp., D. & R. G. W., Grand Jct., Colo.

No. 5—The Cleaning of Pipe Lines—In Water Service—G. V. Coffey (chairman), asst. supvr. b. & b., M. C., Jackson, Mich.; G. E. Martin (vice-chairman), supt. w. s., I. C., Chicago; J. P. Hanley, w. s. insp., I. C., Chicago; L. R. Morgan, transitman, N. Y. C., Syracuse, N. Y.; S. E. Bateman, fore. w. s., M. P., Poplar Bluff, Mo.; R. T. Burns, supvr. w. s., C. & N. W., Boone, Ia.; L. M. Firehammer, gen. supvr. b. & b., Ill. Term., Springfield, Ill.; A. P. Smith, fuel and water supvr., M. P., San Antonio, Tex.; and Garry Smith, fore. w. s., N. Y. C., Rochester, N. Y.

No. 6—Securing Maximum Utilization of Work Equipment—D. T. Rintoul (chairman), gen. br. insp., S. P., San Francisco, Cal.; H. I. Benjamin (vice-chairman), v. chair. stm. ins., S. P., San Francisco, Cal.; W. F. Martens (vice-chairman), gen. fore. b. & b., A. T. & S. F., San Bernadino, Cal.; H. W. Church (vice-chairman), gen. supvr. b. & b., C. & O., Richmond, Va.; F. E. Taggart, asst. engr., I. C., Chicago; F. G. Campbell, asst. ch. engr., E. J. & E., Joliet, Ill.; B. J. Chamberlin, sc. supvr., C. & E. I., Danville, Ill.; John S. Vreeland, assoc. editor, *Railway Engineering and Maintenance*, Chicago; J. E. Hogan, asst. div. engr., C. & O., Hinton, Va.; S. H. Knight, supvr.

wrk. eq., N. P., St. Paul, Minn.; and J. D. Holmes, supvr. b. & b., N. Y. N. H. & H., New Haven, Conn.

No. 7—Revising Working Practices to Eliminate Interference With Traffic—L. R. Lamport (chairman), asst. to ch. engr., C. & N. W., Chicago; G. W. Benson (vice-chairman), supvr. b. & b., C. of Ga., Macon, Ga.; R. W. Cassidy, asst. cost engr., C. & O., Richmond, Va.; A. B. Hillman, engr. m. of w., C. & W. I.—Belt Ry. of Chicago, Chicago; Howard C. Madson, designer, C. & N. W., Chicago; A. L. McCloy, b. & b. supvr., P. M., Saginaw, Mich.; C. A. J. Richards, mast. carp., Penna., Grand Rapids, Mich.; A. C. Jones, b. & b. supvr., Sou., Parrish, Ala.; M. H. Dick, eastern editor, *Railway Engineering and Maintenance*, New York; and R. C. Baker, b. & b. supvr., C. & E. I., Danville, Ill.

No. 8—Carrying Over Bridges and Trestles—H. T. Livingston (chairman), engr. br., C. R. I. & P., Chicago; S. T. Corey (vice-chairman), off. engr., C. R. I. & P., Chicago; John S. Hancock (vice-chairman), br. engr., D. T. & I., Dearborn, Mich.; A. E. Bechtelheimer, engr. of br., C. & N. W., Chicago; L. G. Byrd, supvr. b. & b., M. P., Poplar Bluff, Mo.; W. W. Caines, asst. supvr. b. & b., C. & O., Clifton Forge, Va.; F. W. Hillman, asst. engr. m., C. & N. W., Chicago; Carl Djurik, supvr. bldg., Tenn. Cen., Nashville, Tenn.; Leo D. Garis, asst. gen. br. insp., C. & N. W., Chicago; H. D. Curie, mast. carp., B. & O., Garrett, Ind.; H. W. Jenkins, supvr. b. & b., N. Y. N. H. & H., Boston, Mass.; and J. L. Varker, b. & b. supvr., D. & H., Carbondale, Pa.

American Railway Engineering Association

In accordance with previous announcements, the association held no Annual meeting in March, as in past years. However, a special reviewing committee of the Board of Direction reviewed all of the committee reports that would have been presented before the meeting, if held. Following this, late in March, a letter ballot was sent to all association members to determine the will of the membership with regard to the recommendations of the various committees for additions to or revisions of the Manual.

Late in March also, the new Year Book of the association, Bulletin No. 438, was sent to members, this book, as usual, containing a report of the president to members, the report of the secretary and the treasurer, and lists of members arranged alphabetically and by roads, as well as reference to other general association matters.

The Committees on Outline of Work and Personnel of Committees have completed the make-up of committees and assignments of subjects for the ensuing year, and a booklet containing the assignments and personnel of committees will be mailed to all members of committees early in April. This booklet will show the following standing and special committees and their chairmen, as well as the new subjects that have been assigned to these committees. Among the chairmen of the committees, those designated by asterisks have been newly appointed.

Roadway and Ballast—F. W. Hillman,* asst. engr. maint., C. & N. W., Chicago, chairman. New subjects—Investigate the use and design of wood culverts; specifications for asphalt coating and paving of corrugated iron culvert pipe; structural support for the roadway—struts and piling; prepare consolidated specifications for prepared ballast of crushed stone, crushed slag and gravel; review specifications of leading railroads to determine conformity with A.R.E.A. recommendations; report on use of chatts ballast with recommendation as to whether the A.R.E.A. should prepare specifications; study the use of ballast for out-of-face surfacing to determine proper type and height of lift; and study the effects of tamping.

Ties—John Foley, chief, Lumber section, Division of Purchases, War Production Board, Washington, D. C., chairman.

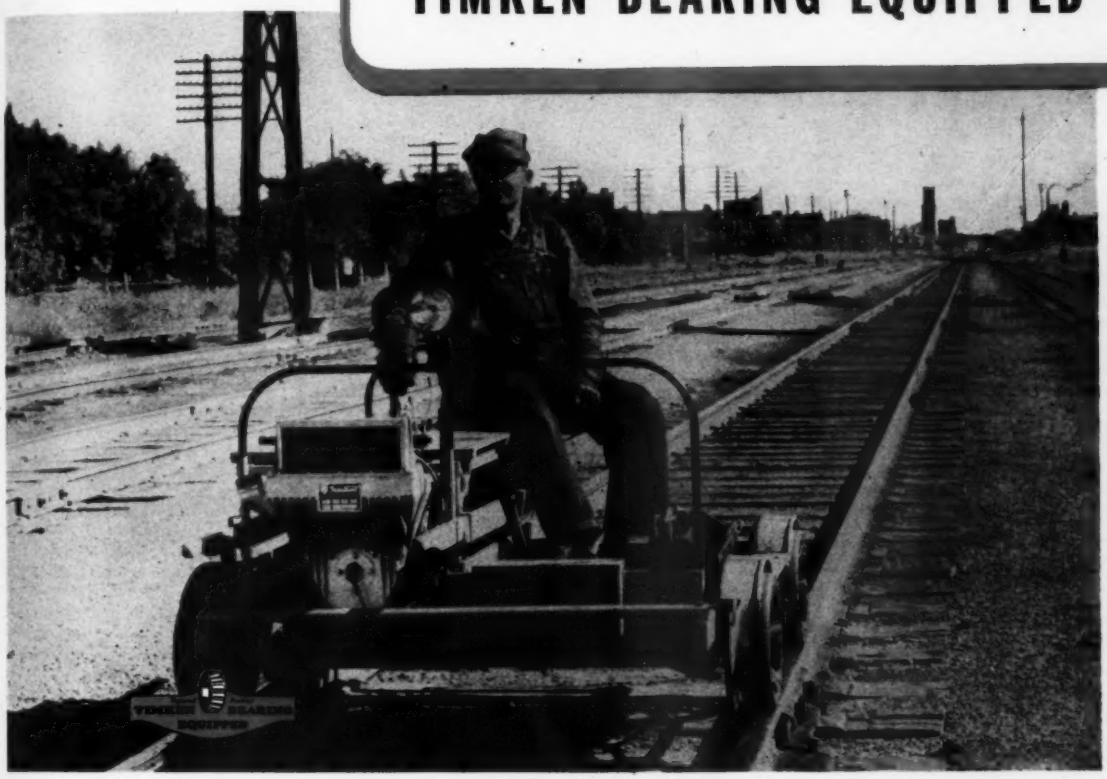
Rail—W. H. Penfield, ch. engr., C. M. St. P. & P., Chicago, chairman.

Track—W. G. Arn, asst. engr., I. C., Chicago,

(Continued on page 314)

Photograph courtesy Fairmont Railway Motors, Inc. All Fairmont cars are equipped with Timken Bearings.

READY FOR ANY EMERGENCY— TIMKEN BEARING EQUIPPED



Don't wait to see what will happen after the war; begin to safeguard your future position now. Put your equipment in condition to meet and beat any competitive challenge. Redesign to use Timken Bearings at every suitable position.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS
"ALL THERE IS IN BEARINGS"

Availability is as important in railroad maintenance equipment as it is in modern main line locomotives. Railway motor cars and trailers must be ready for action whenever needed and be able to continue on the job indefinitely with minimum attention.

As in big modern locomotives and streamlined trains, Timken Tapered Roller Bearings are strong factors of availability for service, dependability and endurance in motor cars of all types; most leading makes use them. Make "Timken Bearing Equipped" a necessary condition of selection when buying new maintenance equipment. The Timken Roller Bearing Company, Canton, Ohio.

chairman. New subjects—Recommendations on number and placing of anti-creepers for various conditions; investigate Track Committee's specifications for the reactance value of lock washers; and study of stresses in tie plates.

Buildings—A. B. Stone, asst. ch. engr., N. & W., Roanoke, Va., chairman. New subjects—Direct locomotive coaling devices; sanding facilities for Diesel locomotives; and fireproofing wood in railway buildings.

Wood Bridges and Trestles—R. P. Hart, br. engr., M. P., St. Louis, Mo., chairman.

Masonry—A. N. Laird, br. engr., G. T. W., Detroit, Mich., chairman.

Highways—J. G. Brennan, asst. to vice-president, N. Y. C., Washington, D. C., chairman.

Signals and Interlocking—H. L. Stanton, asst. ch. engr., signals, Penna., Philadelphia, Pa., chairman.

Records and Accounts—H. L. Restall,* val. engr., B. & M., Boston, Mass., chairman.

Water Service, Fire Protection and Sanitation—B. W. DeGeer, engr. w. s., G. N., St. Paul, Minn., chairman. New subjects—Methods used to determine the existence of electrolysis attacking underground pipe lines, including well casings, and methods of prevention; internal method of boiler water treatment, with description of chemical feeding equipment, etc.; mechanics of foaming and carry-over in locomotive boilers; and high-speed watering facilities for streamline trains.

Yards and Terminals—W. J. Hedley,* const. engr., Wabash, St. Louis, Mo., chairman.

Iron and Steel Structures—J. E. Bernhardt, br. engr., C. & E. I., Chicago, chairman. New subject—The shortening of eye-bars to equalize the stress.

Economics of Railway Location and Operation—M. F. Mannion, off. asst. to ch. engr., B. & L. E., Greenville, Pa., chairman.

Wood Preservation—R. H. Duncan, supt. timber pres., C. B. & Q., Galesburg, Ill., chairman.

Electricity—D. B. Thompson, mech. and elec. engr., N. Y. C., chairman.

Uniform General Contract Forms—J. S. Lillie, property and tax comm'r., G. T. W., Detroit, Mich., chairman.

Economics of Railway Labor—H. A. Cassil, ch. engr., P. M., Detroit, Mich., chairman. New subjects—Economics to be effected by more intensive supervision of gangs by supervisory officers; organization, methods and equipment required for economic maintenance of terminal facilities; labor economies derived from cleaning ballast; economies that can be effected by reduction of clerical work through the elimination and simplification of reports; and means of increasing labor supplies for maintenance of way work for the duration of the war to overcome acute shortages.

Cooperative Relations With Universities—Elmer T. Howson, vice-president and western editor, *Railway Age*, chairman.

Waterways and Harbors—N. D. Hyde, spec. engr., N. Y. C., Chicago, chairman. New subject—Prepare abstract of flood control acts and outline procedure under the acts.

Standardization—A. R. Wilson, engr. of b. & b., Penna., Philadelphia, Pa., chairman.

Maintenance of Way Work Equipment—C. H. R. Howe, cost engr., C. & O., Richmond, Va., chairman. New subject—Power saws for cutting rail.

Clearances—A. R. Wilson, engr. of b. & b., Penna., Philadelphia, Pa., chairman.

Waterproofing of Railway Structures (special)—J. A. Lahmer, sr. asst. engr., M. P., St. Louis, Mo., chairman.

Impact (special)—J. B. Hunley, engr. of str., N. Y. C. (West of Buffalo), Chicago, chairman.

In addition to the new subjects listed in the foregoing, each of those committees dealing with labor or materials was assigned the following new subject: Continue the study of means for conserving labor and materials, including the adaptation of substitute non-critical materials, advising the secretary currently of recommendations that merit emergency adaption and prompt publication.

The only committee to hold a meeting in March was that on Iron and Steel Structures, which met in Chicago on March 31 and April 1. Two other committees will hold the meetings in April, these being the Special Committee on Impact in Chicago on April 2, and the Committee on Buildings in New York on April 20 and 21.

Supply Trade News

Personal

J. D. Holmes has been appointed manager of the newly organized Feedwater Treating division of the **Magnus Chemical Company, Inc.,** Garwood, N.J.

Charles H. Morse, Jr., Charles H. Morse, III, and **Robert H. Morse, Jr.,** have been elected directors of **Fairbanks, Morse & Co., Chicago.** In addition, Robert H. Morse, Jr., assistant sales manager, has been promoted to general sales manager, with headquarters as before at Chicago. Robert H. Morse, Jr., entered Fairbanks-Morse service in 1916 and enlisted in the U.S. Army in 1917. He saw considerable service in France and after the war, returned to Fairbanks-Morse, spending 10 years in the manufacturing divisions of the company. He then served as manager successively of the branch sales offices at Cincinnati, Ohio, Dallas,

Robert H. Morse, Jr.

Tex., and Boston, Mass., and as manager of sales for the Stoker division. In August, 1942, he was promoted to assistant sales manager at Chicago, which position he held until his recent promotion, effective March 25.

Obituary

Wilfred C. Cornu, district salesman of **Templeton, Kenly & Co.,** at Atlanta, Ga., died on March 6.

Max W. Babb, chairman of the board of the **Allis-Chalmers Manufacturing Company,** Milwaukee, Wis., died in that city on March 13. Mr. Babb had been president from 1932 until January 5, 1942, when he became chairman. He was born in Mount Pleasant, Ia., and was appointed attorney for Allis-Chalmers company in 1904. He became vice-president and general attorney of the company during its reorganization in 1913.

Donald C. Barrick, co-founder of the Union Metal Manufacturing Company, Canton, Ohio, and more recently federal co-ordinator of machine tool production, died on March 9 at the Lakeside hospital, Cleveland, Ohio, at the age of 59. Mr. Barrick attended Ohio Northern university and, with his father, founded the Union Metal Manufacturing Company in the fall of 1906. He served for a number of years as secretary and treasurer and

Donald C. Barrick

also as a member of the sales staff. Because of his intimate knowledge of processes and equipment, Mr. Barrick was serving during the present war emergency as co-ordinator of machine tool production.

John G. Barry, honorary vice-president of the General Electric Company, died on March 4. He was 75 years of age. Mr. Barry retired as senior vice-president of General Electric on July 1, 1935, after more than 45 years' service. He entered the electrical industry as an apprentice and test man with the Thomson-Houston Company, a predecessor of General Electric, at Lynn, Mass., in 1885. Completing his apprentice training in 1890, he was assigned to the construction department of Thomson-Houston, later going to the company's Boston, Mass., office. In 1892, when the General Electric Company was formed, he became a member of the railway department. He was transferred from Boston to New York, and then to Schenectady, N.Y., where he was made

John G. Barry

assistant manager of the railway department in 1897, and manager in 1907. He was appointed general sales manager in 1917, while still retaining the managership of the railway department, and advanced to a vice-presidency in June, 1922.

"TRIFLES" CAN COST MILLIONS!

What is a trifle? A few thousandths of an inch of metal isn't much —but in the wrong place it is no trifle, for it *can* be troublesome and costly!

For example, an oversize thread on track bolts makes threading-on of the nut more difficult; bolt shanks slightly oval instead of round, can't be inserted easily. Extra seconds consumed by such "trifles," multiplied over and over in a few miles of track, will prove costly in manpower, lost time, increased expense.

Your protection against these losses is accurately made track accessories. Being specialists in the manufacture of such items, Oliver knows how to produce accurately-made bolts, nuts and rivets in large quantities.

For your own protection, investigate the "trifles" that make for perfection in fasteners.

OLIVER
IRON AND STEEL
Corporation

SOUTH TENTH AND MURIEL STREETS · PITTSBURGH, PENNSYLVANIA

1

TWO WAYS TO TELL THE FACTS

2

"They're Entitled To The Facts"

"Boss, this job's certainly getting tough," ejaculated the star railway salesman to his sales manager.

"And it's going to get tougher before we're through with this war," replied the sales manager.

"I'm afraid that's true. We'll be lucky if we have any friends left on the railways when it's over."

"Why do you say that?"

"We're so far behind in our deliveries—at a time when they need more of our materials than ever before."

"It's true that we are behind—but we're making *some* deliveries. I'm surprised that we're able to help them as much as we are."

"I suppose that's the way to look at it."

"It's the only fair way to, Bill. We're doing everything we can, but there simply aren't enough raw materials to go around. I think we're getting our share, even though it's not all we need. We're lucky to be getting any."

"But our railway friends don't realize this."

"That's probably true. It's your job to see that they do."

"My job! What can I do?"

"Tell 'em."

"I'm doing that wherever I can. But I see only a few of them."

"That's true—and that's what's giving me concern."

"Why can't we tell 'em our story in *Railway Engineering and Maintenance?*"

"That's an idea, Bill. We *can* tell them what we're trying to do for them."

"We'll reach all of them there, for that magazine goes into every corner of our field."

"And I'm sure we can retain our friends, for these railway men are reasonable when they have the facts —and they're entitled to the facts."

RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS

Now they're building BUSSES of Douglas Fir Plywood

But this is just one of Douglas Fir Plywood's startling wartime applications. Because of its versatility, this Miracle Wood is being used in ways undreamed of even a short time ago. And after Victory — *thanks to these unique war jobs* — Douglas Fir Plywood is going to serve you better and in more ways than ever before! *Keep it in mind!*

(At top of page) One of Santa Fe Trailways' smart new 117-passenger Victory Liners. The exterior, interior, partitions and floors are built of Douglas Fir Plywood. Now under construction is a 150-passenger all plywood Victory Liner.

(Above) Exterior-type Douglas Fir Plywood (¼-inch thickness) is fastened with glue and screws to ash frame of these double-deck busses.

Quarter-inch Douglas Fir Plywood provides puncture-proof, easily-finished, dirt-resistant walls and ceilings. Three-quarter-inch plywood is used for floors and partitions.

TO HELP SPEED VICTORY the Douglas Fir Plywood Industry is devoting its entire capacity to war production. We know this program has your approval.

SEND FOR NEW WAR USE FOLDER

Dozens of photographs show many of the war jobs Douglas Fir Plywood is doing all over the world. You'll find it extremely interesting. It's free, of course. Douglas Fir Plywood Association, Tacoma, Washington.

DOUGLAS FIR PLYWOOD

Real Lumber

MADE LARGER, LIGHTER
SPLIT-PROOF
STRONGER

Mall PORTABLE POWER TOOLS

★ TAKE UP THE SLACK IN MAN POWER

Mall 5 H.P. Off-the-Track PORTABLE POWER UNIT

The 5 H. P. variable speed gasoline engine operates 8 quickly interchangeable tools for Circular Sawing, Grinding, Sanding, Drilling, Pumping, Wire Brushing, Concrete Vibrating, Concrete Surfacing and Sharpening Tools. It operates all day on very little fuel. The flexible shaft that transmits power to tools is properly insulated to protect signals. Off-the-track feature reduces accident hazards.

NEW Mall ¼" DRILL 143T

A light-weight, cool running drill for continuous metal drilling under full load. Has free speed of 2850 r.p.m. and full load speed of 1850 r.p.m. Pistol grip and trigger switch simplifies use with either hand. Equipped with universal motor and ventilating fan. Easily and quickly serviced.

Mall CHAIN SAW

5 H. P. GASOLINE ENGINE MODEL

A powerful, time and labor-saving tool that squares heavy timbers and logs to size, and fells trees with surprising speed. Automatic clutch prevents stalling the engine when saw is pinched or forced too hard. Eliminates hand clutch control. Only necessary for operator to manipulate engine throttle when ready to cut. Swivel feature permits cutting at necessary angles. Motorized sharpening device for sharpening right on the job. Easily transported on a hand car. Available in 24", 36" and 48" cutting capacities. Also pneumatic models.

Literature and prices upon application.

RAILROAD DEPARTMENT

MALL TOOL COMPANY

7746 SO. CHICAGO AVE. · CHICAGO, ILL.

A Tribute... and a Responsibility

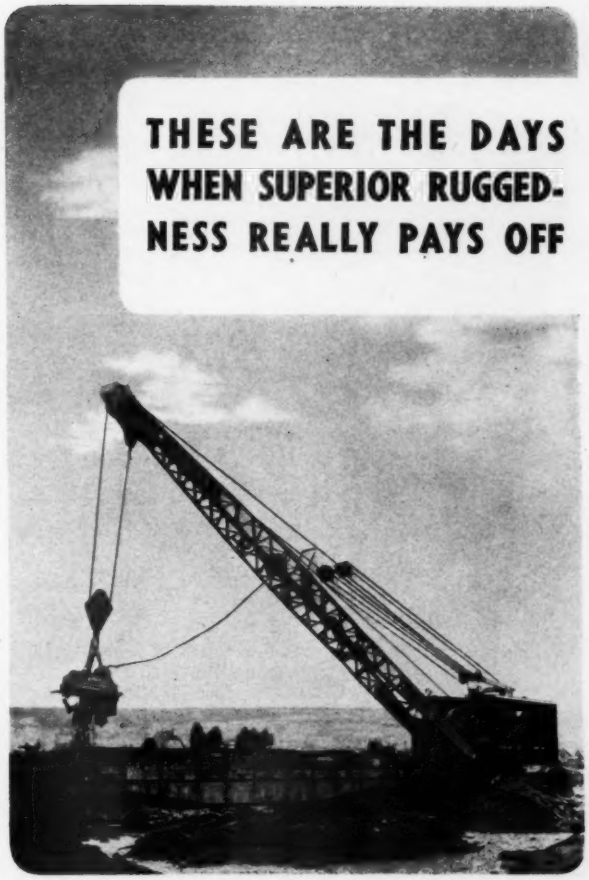
When the men and women of Stanley Electric Tools, Division of The Stanley Works, received the Army-Navy "E" award on February 13, it was a much prized tribute to a great production team during the one hundredth anniversary year of the Company.

Upon their shoulders has rested a triple burden. They have been called upon to supply (1) tools for the armed forces... to construct and maintain camps, bases, and barracks; (2) tools for war industry... to build plants, ships, planes, and other implements of war; (3) tools for the home front... to maintain farms, schools, institutions and essential civilian industries.

Hand in hand with this honor for past performance goes a great responsibility for future performance. These men and women fully realize this responsibility. Far from being contented with the "contribution to Victory" already made, they are earnestly striving to make an even greater contribution in the future. Stanley Electric Tools, Division of The Stanley Works, New Britain, Connecticut.

1843 STANLEY 1943

TRADE MARK



AMERICAN

LOCOMOTIVE CRANES

always have been famous for their long service life. Design and structural improvements in the new models greatly increase this feature. In normal times this longer life was of high value — today it is a priceless asset. The next best thing to being able to buy a new crane is to have an old one that stands up to its work without expensive delays. Your AMERICAN Locomotive Crane has long life built right into it. Conserve this quality; keep your crane producing at full capacity

by

1—Regular — and frequent — lubrication.
2—Making adjustments promptly.
3—Making repairs as needed.
4—Protecting from the weather and from tamperers

SIXTY YEARS OF SAFETY 1883 1943

The Genuine CROSBY CLIP ☆ ☆ ☆

AMERICAN HOIST & DERRICK CO.
SAINT PAUL MINNESOTA

AMERICAN TERRY DERRICK CO. . . . South Kearny, N. J.

Classified Advertisements

Use this section when seeking a new man, new position, or when buying or selling secondhand equipment.

CLASSIFIED ADVERTISEMENTS, $10.00 an inch, one inch deep by three inches wide, an insertion.

EMPLOYMENT ADVERTISEMENTS, 10 cents a word a month, including address, minimum charge $2.00.

Remittance must accompany each order.

Railway Engineering and Maintenance
Classified Advertising Department
105 West Adams St., Chicago

WANTED!

16, 20, 24 or 30 cubic yard AIR DUMP CARS. Any quantity, type, make or location. Also 10- to 30-ton Gas or Diesel Locos.

IRON & STEEL PRODUCTS, Inc.
38 years' experience
13486 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

NEW AND SLIGHTLY USED SOLID MANGANESE RAILROAD CROSSINGS
Less Than Half Price

3,	9020,	40°55'	3,	9021,	57°37'
1,	9020,	57°37'	1,	11025,	57°37'

IRON & STEEL PRODUCTS, INC.
38 years' experience
13486 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

ALPHABETICAL INDEX TO ADVERTISERS

SPEED AND DURABILITY with POZZOLITH

One of many railroad bridges in which the advantages of Pozzolith were realized.

WHY RAILROADS USE POZZOLITH..

REPORTS from leading railroads show that Pozzolith has proved a valuable aid in realizing important concrete requirements.

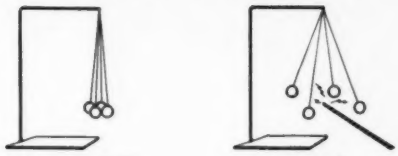
Used for more than ten years in bridges, tunnels, retaining walls, tanks, etc., Pozzolith achieves the following results:

1. PERMITS REDUCTION IN WATER . . . water can be reduced as much as 20%, yet placeability is *increased.*
2. LOWERS PLACING COST . . . less man-hours required.
3. SPEEDS CONSTRUCTION . . . forms can be removed sooner because of high-early strength.
4. PERMITS SAVING REINFORCING STEEL . . . higher ultimate strength without adding more cement.
5. INSURES BETTER CONCRETE . . . controls honeycombing; increases watertightness and durability.

Write for complete information on Cement Dispersion and the advantages of Pozzolith.

THE MASTER BUILDERS CO.
CLEVELAND, OHIO TORONTO, ONTARIO

HOW POZZOLITH
The Cement Dispersing Agent
IMPROVES CONCRETE



"Flocculated" Dispersed

Remember in physics how a group of suspended pith-balls would fly apart when given an electrostatic charge?

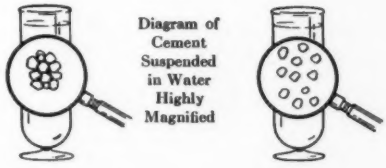


Diagram of Cement Suspended in Water Highly Magnified

Flocculated Dispersed

Similarly, cement particles which bunch together in water (flocculate) are separated by this same electric force when Pozzolith is added to the mix. Thus cement surface area and vital surface reactions (hydration) are greatly increased.

•

OTHER MASTER BUILDERS PRODUCTS USED EXTENSIVELY BY RAILROADS

EMBECO — non-shrink grouting and concrete repair material.
MASTERPLATE—non-colored and colored armoured surface floors.
OMICRON MORTARPROOFING — shrinkage control for masonry mortars.
MASTERKURE — membrane curing agent for all concrete.

MASTER BUILDERS

MASTERBUILT PRODUCTS

POWERFUL AS A TORNADO

Easy-breathing — yet packing all the wallop of a charging storm — this Rail Car Compressor, a Worthington Blue Brute, is built for maintenance men who want more air, under complete control, at lower cost.

You'll like its *smoother, steadier* power, economically controlled by Worthington's repair-free Feather* Valves. You'll cut your costs and downtime on those vital road-laying, road-maintaining jobs that keep our wartime traffic rolling!

There are Worthington Blue Brute Compressors to meet your every need; self-propelled and non-self-propelled; on skids or wheels; gasolene, diesel or electric-driven; available in 60 to 500 cubic foot sizes — all with Worthington's outstanding economy, ease of operation, freedom from maintenance worries.

With Worthington Blue Brute Rock Drills and Air Tools *using less air,* while Blue Brute Compressors *deliver* more air, you'll find yourself getting more *worth* from air, this year, and for years to come.

Behind the Fighting Fronts with

BLUE BRUTES

Blue Brutes — in uniforms of olive drab and battleship gray‡ — are at work in Australia today, in building and maintaining new supply lines under General MacArthur's command. Blue Brutes are doing similar jobs for Uncle Sam in hundreds of Army camps, Navy yards, air bases and ordnance plants behind our fighting fronts.

*Reg. U. S. Pat.
‡Blue Brute Compressors and Air Tools are painted olive drab for the Army and battleship gray for the Navy.

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Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

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